

Fort Hays State University

FHSU Scholars Repository

Master's Theses

Graduate School

Fall 1932

A Survey In The High Schools of Western Kansas On The Relation of Training And Experience of Teachers of Commercial Subjects To The Achievement of Pupils Enrolled In These Classes

Melvin Wilbur Torrey

Fort Hays Kansas State College

Follow this and additional works at: <https://scholars.fhsu.edu/theses>



Part of the [Education Commons](#)

Recommended Citation

Torrey, Melvin Wilbur, "A Survey In The High Schools of Western Kansas On The Relation of Training And Experience of Teachers of Commercial Subjects To The Achievement of Pupils Enrolled In These Classes" (1932). *Master's Theses*. 214.

DOI: 10.58809/CAAM8659

Available at: <https://scholars.fhsu.edu/theses/214>

This Thesis is brought to you for free and open access by the Graduate School at FHSU Scholars Repository. It has been accepted for inclusion in Master's Theses by an authorized administrator of FHSU Scholars Repository. For more information, please contact ScholarsRepository@fhsu.edu.

A SURVEY
IN THE HIGH SCHOOLS OF WESTERN KANSAS
ON
THE RELATION OF TRAINING AND EXPERIENCE
OF TEACHERS OF COMMERCIAL SUBJECTS
TO THE ACHIEVEMENT OF PUPILS
ENROLLED IN THESE CLASSES

A

Thesis

Submitted to the Department of Education
and the Graduate Council of
The Fort Hays Kansas State College of Hays
in Partial Fulfillment
of the Requirements for the Degree of
Master of Science

by

Melvin Wilbur Torrey, B.S.

Approved for the Department:

Dr. Robert T. McGrath

Approved for the Graduate Council:

R. H. Coe

Date

Aug. 18, 1932.

PREFACE

The carrying out of this study has involved investigation in the field of Education and of Commerce. In the carrying forward of the study I am deeply grateful to Dr. Robert T. McGrath for helpful criticism and suggestions which he gave to the writer, and also to Mr. L. W. Thompson of the Fort Hays Kansas State College for assistance rendered. The nature of the study required the co-operation and interest of many persons. Especially am I indebted to superintendents, high school principals, and commercial teachers in the high schools of West and Central Kansas, without whose help the project would have been impossible.

This study should be of interest, primarily, to persons interested in teachers' qualifications and the necessity for better teacher training in the commercial subjects. It should be also of interest to those responsible for the organization of curricula in colleges. It will give to these persons a better estimate of the amount of subject matter covered in the average high school commercial department.

The investigation might prove to be a method by which we are lead into a field of discovery, as to just where commercial departments are being altered or changed because of different degrees of preparation by the teachers in commercial subjects and just what the value might be of increased standards in the teaching profession in this particular field.

TABLE OF CONTENTS

| Chapter | Page |
|--|--------|
| I Introduction - - - - - | 1 |
| II The Procedure - - - - - | 7 |
| XII Presentation of Data - - - - - | 14 |
| IV Summary of Data and Conclusions - - - - - | 39 |
| Bibliography - - - - - | 53 |
| Appendix - - - - - | 1 |

LIST OF TABLES

| Table | | Page |
|-------|--|------|
| I | High Schools used in This Project and Cities Where Located - - - - - | 15 |
| II | Schools Actually Used in Testing Program - - - - - | 16 |
| III | Group I Class Measures - - - - - | 21 |
| IV | Group II Class Measures - - - - - | 23 |
| V | Group III Class Measures - - - - - | 24 |
| VI | Group IV Class Measures - - - - - | 25 |
| VII | Group V Class Measures - - - - - | 26 |
| VIII | Mean of Measurements Group I - - - - - | 27 |
| IX | Mean of Measurements Groups II, III, IV, and V - - - | 28 |
| X | Measures Computed on Group Distribution in Typewriting | 39 |
| XI | Measures Computed on Group Distribution in Bookkeeping | 40 |
| XII | Measures of Comparison Within Each Group in Typewriting - - - - - | 41 |
| XIII | Measures of Comparison Within Each Group in Bookkeeping - - - - - | 42 |
| XIV | Comparisons Based on Results in Table X - - - - - | 43 |
| XV | Comparisons Based on Results in Table XI - - - - - | 45 |
| XVI | Comparisons Based on Results in Table XII - - - - - | 46 |
| XVII | Comparisons Based on Results in Table XIII - - - - - | 47 |
| XVIII | Summary of Results - - - - - | 51 |

MAPS AND CHARTS

| Map Number 1 | State of Kansas - - - - - | Page 8 |
|--------------|------------------------------------|-----------|
| Chart | | |
| 1 | Averages of the Ranges - - - - - | 30 |
| 2 | Averages of the Averages - - - - - | 31 |
| 3 | Averages of the Medians - - - - - | 32 |
| 4 | Averages of the Q3 - - - - - | 34 |
| 5 | Averages of Q1 - - - - - | 35 |
| 6 | Averages of Q - - - - - | 36 |
| 7 | Averages of S D - - - - - | 37 |

CHAPTER I
INTRODUCTION

While assisting in the work of the commerce department of the Fort Hays Kansas State College, the writer frequently had called to his attention the degree of thoroughness, or lack of it, with which high school students are being prepared for college work. This degree of preparation presented itself frequently in the matter of pre-view tests given to beginning college students in commercial courses, the purpose of which was to discover the placement of these students in college classes. For instance, many classes in the commercial department of the college require for entrance on the part of the student, certain courses which may or may not have been taken in the high school. In many instances students did have the pre-requisite courses in high school but were unable to continue with the advanced work in college.

While there had been, no doubt, various studies made concerning the effect of student preparation upon later mastery of subject matter, the writer was unable to find any study which dealt directly with achievement in commercial subjects in high school. A few related studies have been made, for example, E. P. O'Brien's¹ study in which he found that, "in 243 high schools, 2800 students were enrolled in classes taught by teachers who did not have definite training for the subjects they were teaching." Leavere S. Lyon says, "Although Kansas has three teachers' col-

¹O'Brien, E. P. Status of business courses in high school, quoted by Fink, E.L., Commercial Teachers and Commercial Education in High Schools. p. 10.

leges which give complete training to commercial teachers, yet regardless of the fact that fundamental to any general growth in business education is proper teaching, the commercial teacher training has in no way kept pace with teacher education in other fields.¹ Again, J. O. Malott² calls attention to the need of better commercial teachers in this way, "There has been a general awakening during the past two years regarding the importance of commercial teacher training. The leaders have urged that the key to the improvement of commercial education on a long term basis is a better program for commercial teacher training and certification. The Kansas state department of education and the larger universities have taken a great interest in the preparation of commercial teachers. Further a number of investigations have been made to show the present status of Commercial teacher training. Recent developments, in commercial training in secondary schools, have emphasized the need for improvement in teacher training to keep pace with and make possible further progress in development of local programs. Inadequate preparation of commercial teachers is the chief reason for the failure to apply with dispatch the clear and convincing findings of research." Inquiry concerning the training of secondary commercial teachers by the United States Bureau of Education in 1919 revealed the fact that hardly any attention was then given in the United States to commercial teacher training.³

¹ Pink, E. L. Education for Business. (Lyon, Leavett S., in the Introduction.)

² Ibid. Commercial Studies. (Malott, J. O. in the Introduction.)

³ Ibid. Commercial Teachers and Commercial Education, p. 10.

Another investigation in commercial teaching is one by L. C. Guffrey of Kansas State Teachers' College of Pittsburg, Kansas. This is a study of "The Educational Status of Those Engaged in the Teaching of Commercial Subjects in Kansas." Finally an investigation by E. L. Fink of the University of Kansas gave attention to the problem of "Commercial Teachers and Commercial Education in Kansas High Schools in 1932." This study was made to satisfy a part of the requirements for a Master's Degree. The data for the study were obtained from an analysis of the annual reports of Kansas high school principals now on file in the office of the State High School Supervisors in Topeka, Kansas, and will be referred to constantly in this thesis for the reason that the study prompted the writer in the present study, to the extent that Fink's purpose was to discover the training and experience of teachers in the field, the present study is a "Survey in the High Schools of Western Kansas on the Relation of Training and Experience of Teachers of Commercial Subjects to the Achievement of Pupils Enrolled in These Classes," limited to the subjects of bookkeeping and typewriting.

In Kansas as well as in other states there is a set of standards, formulated some years ago by the North Central Association for the Accrediting of Secondary Schools, which affects the teaching profession. These standards are disregarded in some respects. For instance there are today in some schools teachers of commercial subjects who are poorly prepared for teaching bookkeep-

ing and typewriting.

These standards were drawn up and adopted by the North Central Association for the Accrediting of Secondary Schools. Some of the requirements are as follows:

- (1) No class enrollment should exceed 30 pupils. However this has been rescinded very recently.
- (2) Four years of academic work on the part of the teacher is required, or, as stated by the Kansas State Board of Education in standards for Class "A" high schools: "For the department in which a teacher instructs, preparation must be shown of at least twenty semester hours college credit, toward which a maximum of ten hours high school may be substituted at the rate of five hours per high school unit."¹

As noted previously, all teachers in accredited high schools in the North Central Association for the Accrediting of Secondary Schools should be graduates of standard institutions of collegiate rank requiring the completion of 120 semester hours work, or qualified by long experience and successful teaching. Another index pointing in the same direction, is the recommendations from the Kansas State Bureau of Education embodied in the following points:

- (1) Three, or when possible, four years of training beyond high school;
- (2) General education in those arts and sciences that will contribute most to the social and professional effectiveness of the teacher, definitely eliminating those that will contribute relatively less than the background courses

¹ Pink, E.L., Commercial Education and Commercial Teachers. p. 12.

- in education and commerce and advanced training in the special subject-matter fields and methods;
- (3) Professional courses in philosophy and psychology that will contribute most to teacher effectiveness;
 - (4) Background courses in economics and business organization;
 - (5) Completion of secondary school content in each subject he is licensed to teach plus advanced training in that subject of not less than 20% of the total number of hours in the secondary school subject;
 - (6) A minimum of four weeks of business experience in his major field;
 - (7) A special methods course in his major field;
 - (8) Practice teaching in each semester of each subject he is to teach.

These have been cited to show the effectiveness of training and experience of teachers in relation to the varying degrees of achievement made by pupils taught by teachers of bookkeeping and typewriting. This study is limited to Commercial Teaching in High schools of the first, second, and third class in Kansas, and to certain subjects taught in these schools, namely beginning bookkeeping and beginning typewriting.

E. L. Fink¹ in his study states, "There are in our commercial departments of Kansas High Schools a great number of teachers who have charge of these departments who do not have either the

¹Fink, E.L. Commercial Teachers and Commercial Education.

necessary requirements nor the ability to carry on the work of these departments." Just what effect this has upon the effectiveness of teaching bookkeeping and typewriting remains to be seen.

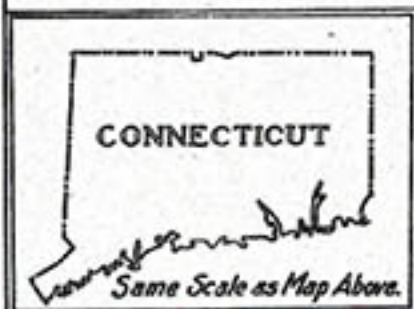
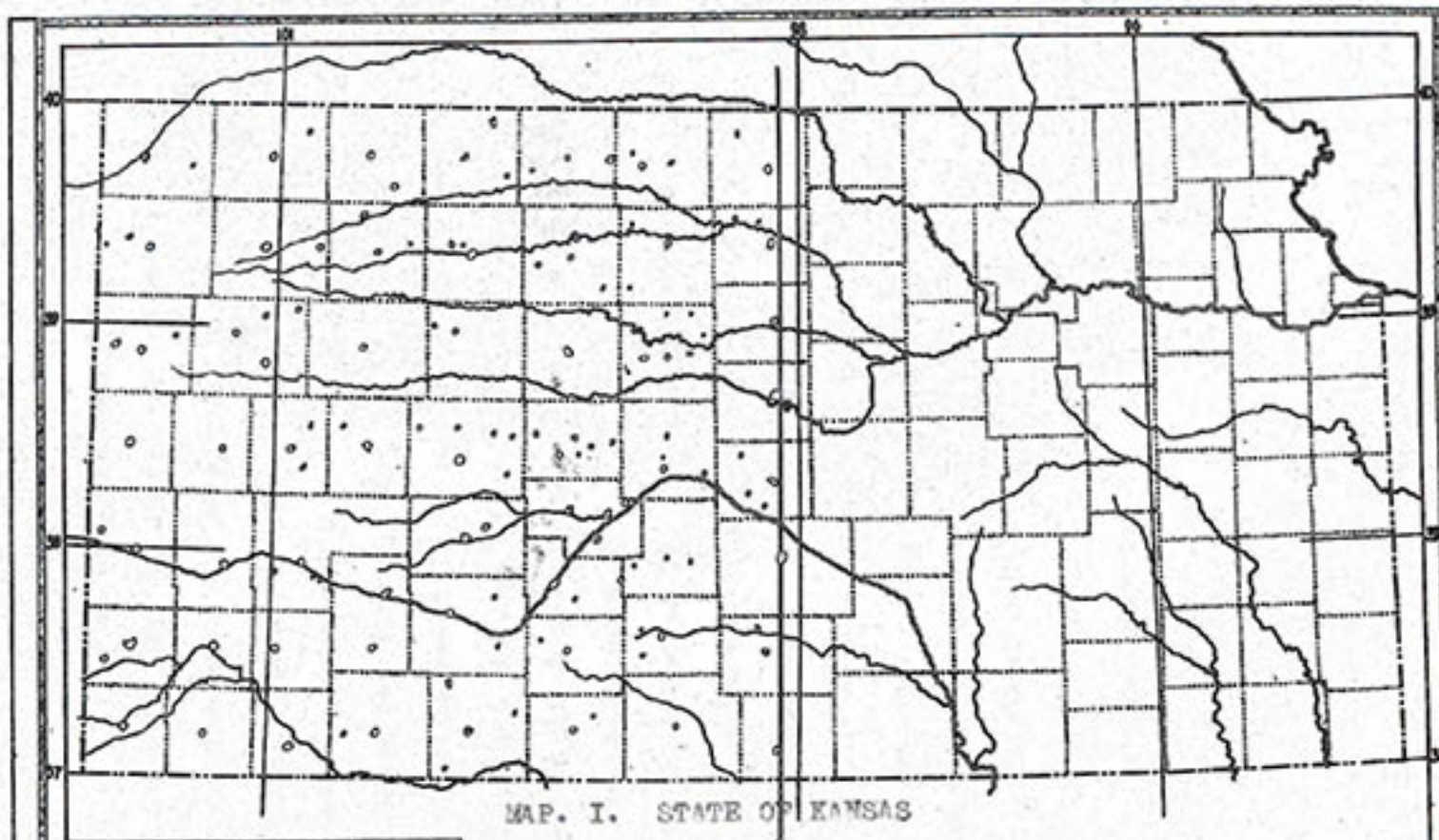
The writer believes these criticisms of commercial education and commercial teaching may safely be used as an index of the situation at large, and that work and further investigation may be carried out to a greater extent by others interested in similar study and research.

CHAPTER II

THE PROCEDURE

As previously stated, this study is a survey entitled: "A Survey in the High Schools of Western Kansas, Based on the Effectiveness of the Training and Experience of Teachers in Relation to the Degree of Achievement Made by the Pupils in Bookkeeping I, and in Typewriting I, in all Classes of High Schools."

The procedure used in this study was as follows: (1) A thorough investigation of previous studies made in this field. Particularly Fink's investigation in which his data on the preparation of teachers in the field during the previous year, were very useful, as well as the summary which he prepared of the number of schools offering commercial subjects out of the total number of high schools in the state of Kansas, and also the number of schools that offered definite subjects in commercial work; (2) An estimate on the probable frequency of all commercial subjects in the high schools of Kansas. This involved a selection of the area to be studied, which in this study involves the high schools in that part of the state of Kansas lying west of an arbitrary line drawn north and south through Ellsworth, Kansas, as shown in the map on page 8; (3) The third step involved problems closely related to each other, such as the construction of a questionnaire to cover the training and experience of commercial teachers, and second, that of selecting and determining the mailing lists to whom the questionnaire should be mailed. The questionnaire was worked out under the direction of Dr. Robert T. McGrath



DATA

| |
|--|
| |
| |

0 25
SCALE OF STATUTE MILES

of the Department of Education, and Mr. Leonard W. Thompson of the Commercial Department of the Fort Hays Kansas State College. In selecting the mailing list, effort was made to include a high school in every county seat town. Also to supplement it with every other sizeable four year high school in the county, regardless of classification. The only deviation from this procedure was that in which the writer had positive knowledge that commercial work was not offered in a given high school. Some idea of the scope of the schools selected may be gained by study of the map on page 8. Each dot represents a high school included in the investigation. Accompanying the questionnaire was a letter of explanation. An Exhibit of both the letter and questionnaire are presented on pages 10 and 11. The superintendent or principal of the high school together with the commercial teacher were asked to examine the questionnaire and by return mail to indicate whether or not they would co-operate in the study. (4) The questionnaire was mailed direct to the superintendent or principal of each high school selected, regardless of its classification. The questionnaire in turn was to be referred to the commercial teacher or teachers concerned in each school. Supplemented by personal inquiry of the writer, the questionnaire was mailed to approximately 150 high schools in Western Kansas. (5) Approximately fifty (50) per cent of the questionnaires were returned. The problem there became one of organizing the data in such a way as to permit comparisons. The questionnaires were grouped on the basis of the training and experience of the tea-

Hays, Kansas
March 1, 1932

I am carrying on graduate work in the Graduate School at F. H. K. S. C. of Hays, and as a part of my graduate study I am doing a piece of research work in which it is vitally necessary that I have the cooperation of the Superintendents and Commercial teachers of the High Schools of Western and Central Kansas. The work that I am doing concerns the Commercial Departments of the various High Schools of this region.

This project is based on "The Relation of Training and Experience of the Instructor to Pupil Attainment" in the Commercial Departments of the High Schools of Western Kansas. I propose to carry out this project by a classifying of teacher groups from the results of this enclosed information blank which is later to be followed up by an achievement test, probably in Bookkeeping I, Typing I, and Shorthand I, and a final comparison of results.

I am asking that this information blank be filled out at your earliest convenience and returned to me. At a later date I will send these before mentioned achievement tests to you to be administered by you or your Commerce teacher to the students enrolled in such classes. As a reciprocation of this favor I shall be very glad to mail you a composite report of the results obtained in this survey, and aside from this, trust that I shall have an opportunity of rendering you a like favor.

Trusting that I may count on the cooperation of you and your Commercial teacher to the extent that I have outlined, I wish to thank you in advance, and remain

Very truly yours,

Melvin W. Torrey
321 West 8th Street
Hays, Kansas

44013

11.

TRAINING AND EXPERIENCE FOR COMMERCIAL TEACHERS

Date _____

Name _____ Age _____ Sex _____ Nationality _____
 Present Location _____
 Former Home _____

HIGH SCHOOL AND COLLEGE TRAINING

(A) HIGH SCHOOL

Name _____ Where _____ When _____ Degree _____ Major _____ Minor _____

(B) BUSINESS COLLEGE

(C) COLLEGE OR UNIVERSITY

TRAINING FOR COMMERCIAL TEACHERS

| SUBJECT | CREDIT | SCHOOL | INCLUSIVE DATES | TIME SPENT |
|-------------|--------|--------|-----------------|------------|
| TYPING | | | | |
| BOOKKEEPING | | | | |
| SHORTHAND | | | | |
| ECONOMICS | | | | |
| ECON. GEOG. | | | | |
| PENMANSHIP | | | | |

TEACHING EXPERIENCE

| NAME OF SCHOOL | WHERE | INCLUSIVE DATES | DEPARTMENT TAUGHT |
|----------------|-------|-----------------|-------------------|
| (A) SECONDARY | | | |

(B) HIGH SCHOOLS

(C) JUNIOR COLLEGE OR BUSINESS COLLEGE

DATA ON PRESENT POSITION

| SUBJECTS NOW TEACHING | NUMBER IN CLASS | HOURS PER WEEK |
|-----------------------|-----------------|----------------|
| | | |
| | | |
| | | |
| | | |

others. A few teachers varied so far from the median, as shown by responses, in training and experience that the writer was unable to use them in this investigation. The number, however, was exceedingly small. (6) Concurrently with the other work of organizing the data was that of the selection of tests to be administered. In bookkeeping I tests were designed based on Elwell and Toner's Elementary Course in Bookkeeping and Accounting, a text extensively used in Kansas. The tests include four parts: the first of which covered the classification of accounts, the second part consisted of true-false statements covering the portion of the text to be taught during the first year; the third part involved completion problems; and the fourth part of the test consisted of a group of items to be classified under debit and credit. An example of the test is presented in Appendix i, ii, and iii. The typewriting test was made up in the same manner and consisted of the following parts: first a paragraph which included a test in speed, accuracy, indenting, and tabulating; second a part which consisted of two problems in accuracy and centering; and finally a composition project on the parts of the typewriter. A sample of this test is found on page iv of the Appendix.

Following this procedure the tests were mailed to the teachers of commerce in the high schools in the area which had satisfied the classification and who had expressed their willingness to participate in the project. The tests were administered by the teachers to their pupils. Only a few days time elapsed be-

tween the giving of the tests by the teachers in all schools, in order that there might be no marked degree of difference in the achievement of classes. The tests were then returned to the writer for scoring and organization into groups as previously stated.

CHAPTER III

PRESENTATION OF DATA

In the organization and presentation of the data the writer has tried not to include superfluous matter that would add nothing to the conclusions. He has included only those items that are necessary for intelligent interpretation.

The map of the State of Kansas shows the distribution of the schools upon which this study is based. On pages 17, 18, and 19 is represented the names of the towns and villages in which the high schools are located (Table I). From this list the writer selected a group of schools which is a fair sample of the whole number of schools in Western Kansas. These are listed on page 20, Table II.

In order that these schools might be used in this investigation it was necessary that the principals and superintendents as well as the commercial teachers be willing to give their time and that of their classes to the administration of the tests.

The writer feels that the sample is fair for the high schools of Western Kansas in that not only are the schools represented in this study well scattered over this particular section of the state, but they are also sufficient in number when compared with the total schools offering some form of commercial work. The writer has used practically every school that gave indication of having some form of commercial work, and this included approximately 50 schools with a student enrollment in these classes of approx-

imately 955. For purposes of comparison the teachers were grouped according to training and experience as follows: (I) The first group is composed of those who have completed a four year high school course, with a life certificate to teach, and are graduates of an accredited college with a major in commerce, and experience ranging from three (3) years upward in the teaching field. (II) Group two includes the teachers who have completed a four year high school course and are graduates of an accredited college with a life certificate to teach, with a major in commerce and experience in teaching ranging from one to three years. (III) Group three consists of the teachers who have completed a four year high school course, and are graduates of an accredited college with a life certificate to teach, with a minor in commerce and experience ranging from one to four years. (IV) Group four consists of those who have completed a four year high school course, and are graduates of an accredited college with a life certificate to teach, with no special work either as a major or minor in the field of commerce with the exception of one summer of work in business college, and experience ranging from one to four years in teaching. (V) Group five consists of those who have completed a four year high school course, and are graduates of an accredited college with a life certificate to teach, and having done additional work other than that required for certification, either in the form of Master of Science Degree of definite work toward one. In this particular group a very great range of experience was discovered which will be con-

sidered at some length.

This classification was suggested by the returns of the initial questionnaire, and adopted for the reason that it gives clearly defined groups with which to work.

In making comparisons between the various groups the following measurements were used:¹.

The range commonly defined as the difference between the highest and the lowest of a series of scores; the average which is determined by dividing the sum of the scores by the number of individual scores in the series; the median commonly known as the midpoint of a series of scores; the Q3 below which are contained 75% of the total scores in a series; Q1 below which are contained 25% of the total scores in a series; Q which is the difference between Q3 and Q1, divided by two, used as a measure of the variability of the particular group; and lastly the standard deviation which is the square root of the mean or average of the squared deviations taken from the average of the distribution. The standard deviation includes the area below and above the average in a series of scores and includes 68.26% of the total scores. It is not affected by excessive scatter of the scores and thus has the advantage for comparison of groups.

¹Garrett, Henry E. Statistics in Psychology and Education. pp. 8-40.

TABLE I

High Schools Used in This Project and Cities Where Located.

| | | |
|--------------|------------|-------------|
| Agra | Coolidge | Fowler |
| Athol | Colby | Garfield |
| Alexander | Cimarron | Geneseo |
| Atwood | Coldwater | Goodland |
| Ashland | Chase | Garden City |
| Almena | Cullison | Greensburg |
| Arnold | Claflin | Great Bend |
| Anthony | Collyer | Gem |
| Alden | Carnesiro | Grainfield |
| Bird City | Coats | Grinnell |
| Beloit | Codell | Grove |
| Bison | Covert | Gaylord |
| Bogue | Dresden | Healy |
| Banker Hill | Deerfield | Holcomb |
| Brewster | Dighton | Hudson |
| Burdett | Dodge City | Herndon |
| Bazine | Densmore | Hoxie |
| Buffalo Park | Dorrance | Hill City |
| Belpre | Elkhart | Hugoton |
| Brownell | Ellsworth | Hays |
| Buhler | Ellinwood | Hatchinson |
| Bushton | Ellis | Hanston |
| Bucklin | Englewood | Holyrood |
| Burr Oak | Ford | Hoisington |

TABLE I

(con'd)

| | | |
|----------------|--------------|-----------------|
| Hunter | Manly | Ransom |
| Ingalls | Morland | Russell Springs |
| Jennings | McCracken | Radium |
| Jetmore | Minneola | Randolph |
| Johnson | Montezuma | St. Francis |
| Kanorado | Ness City | Sharon Springs |
| Kanopolis | Norton | Scott City |
| Kingsman | Natoma | Stockton |
| Kinsley | Mallinville | Smith Center |
| Lucas | Oberlin | St. John |
| Luray | Osborne | Sterling |
| Lecti | Otis | Selden |
| Lakin | Oakley | Schoenohon |
| LaCrosse | Pawnee Rock | Stockholm |
| Larned | Plainville | Stafford |
| Lincoln | Pratt | Sylvan Grove |
| Lyons | Phillipsburg | Sylvia |
| Louisa | Pierceville | Spearville |
| Liberal | Panokee | Syracuse |
| Monument | Quinter | Sublette |
| Manter | Rozel | Speed |
| Manning | Ruleton | Tribune |
| Meade | Richfield | Weskan |
| Medicine Lodge | Rexford | Winona |
| Mankato | Russell | Wakarusa |

TABLE I
(cont'd)

| | | |
|---------|---------|-------|
| Wilmore | Waldo | Utica |
| Wilson | Ulysses | |

These are the cities in which high schools were located that were used as the first mailing list. The initial questionnaire on the training and experience of commercial teachers were sent to superintendents, principals, and the commercial teachers in these high schools.

TABLE II
SCHOOLS ACTUALLY USED IN TESTING PROGRAM

| | | |
|-------------|----------------|----------------|
| Ashland | Ellis | Norton |
| Almena | Goodland | Osborne |
| Alden | Gem | Pawnee Rock |
| Bird City | Hoxie | Pratt |
| Bison | Hays | Phillipsburg |
| Bunker Hill | Hutchinson | Quinter |
| Burdett | Jetmore | Rexford |
| Coolidge | Kingman | Russell |
| Colby | Kinsley | St. Francis |
| Cimarron | LaCrosse | Sharon Springs |
| Coldwater | Larned | Smith Center |
| Chase | Lenora | St. John |
| Cullison | Manning | Sterling |
| Claflin | Medicine Lodge | Selden |
| Codell | Menlo | WaKeeney |
| Dodge City | Montezuma | Wilson |
| Ellinwood | Ness City | |

High schools located in these towns gave indication of willingness to participate in the carrying out of this investigation.

TABLE III
GROUP I CLASS MEASURES

| TYPEWRITING | | | | | | | | | |
|-------------|---------|--------|----------|----------|---------|---------|--------|---------|--|
| T 1 | No 2 | R 3 | Ave 4 | Med 5 | Q3 6 | Q1 7 | Q 8 | SD 9 | |
| A | 39 | 75 | 59.84 | 61 | 72.5 | 44.8 | 15.8 | 44.65 | |
| B | 24 | 41 | 70.9 | 73 | 82. | 60. | 11. | 12.65 | |
| C | 27 | 48 | 70.22 | 72 | 82.5 | 54. | 14.3 | 15.36 | |
| D | 14 | 36 | 81.35 | 84 | 90. | 71.5 | 9.5 | 11.22 | |
| E | 25 | 52 | 67.16 | 63 | 76. | 55.8 | 10.1 | 13.92 | |
| F | -- | -- | ----- | -- | --- | ---- | ---- | ----- | |
| BOOKKEEPING | | | | | | | | | |
| A | 12 | 42 | 64.75 | 68. | 70 | 59. | 5.5 | 11. | |
| B | 12 | 32 | 77.4 | 69.5 | 74 | 59. | 7.5 | 12.49 | |
| C | 11 | 43 | 58.54 | 54. | 72.3 | 40.8 | 15.6 | 14.96 | |
| D | 12 | 35 | 65.5 | 62.5 | 75. | 56. | 9.5 | 11. | |
| E | 16 | 46 | 60.25 | 62. | 74. | 42. | 15. | 15.46 | |
| F | 21 | 45 | 67.71 | 70. | 77. | 55.8 | 10.6 | 13.45 | |

Table III is read in the following manner. In the upper left hand corner column 1 headed T represents the individual teacher in the typewriting classes of group I. Column 2 lists the number of students in each class, column 3, headed as R gives the averages made by the classes of each teacher, column 5 gives the median or midpoint of the particular series of scores of each teacher, column 6 gives the Q3 or the score below which 75% of the class fall, column 7 gives the Q1 or the score below which 25% of the class scores fall, column 8 gives the Q or difference between Q3 and Q1 divided by two. Column 9 gives the standard deviation and indicates the central tendency of each class.

In Table III, the letter A in the upper left hand corner means, by reading across the page, that teacher A had 39 pupils in her

typewriting class, the range of the scores was 73, the average of the scores made by the class was 59.84, the median or midpoint of the scores when arranged in a series was 61, the upper quartile of the class, or Q3, was 72.3 and that 75% of the class scores fall below this, that the lower quartile score, or Q1, was 44.8 and that 25% of the total class scores fall below this, that the Q for the class was 13.8 or that just that number of individuals are included in the distance from Q1 to Q or from Q to Q3, and finally that the standard deviation of the group was 14.45.

Then, beginning in the upper left hand corner of the bookkeeping, we find teacher A to have 12 pupils in bookkeeping class, their range from highest to lowest score to be 48, the class average 64.75, the median 68, Q3 is 70, Q1 is 59, Q is 5.5, and the standard deviation is 11.

TABLE IV
GROUP II CLASS MEASURES

| TYPEWRITING | | | | | | | | | |
|-------------|----|----|-------|------|------|------|------|-------|--|
| T | Nc | R | Ave | Med | Q3 | Q1 | Q | SD | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| A | -- | -- | -- | -- | -- | -- | -- | -- | |
| B | 9 | 67 | 55. | 51. | 56.5 | 39.3 | 13.6 | 12.9 | |
| C | 22 | 59 | 70.24 | 78. | 79.6 | 60.2 | 9.7 | 15. | |
| D | 28 | 45 | 71.77 | 78.5 | 85. | 62. | 11.5 | 13.67 | |
| E | 24 | 66 | 61.83 | 65.5 | 70. | 52. | 9. | 12.98 | |
| F | 10 | 25 | 69.5 | 91.5 | 97.5 | 77.5 | 10. | 9.27 | |
| G | 14 | 43 | 71.14 | 74. | 79.5 | 57. | 11.3 | 12.76 | |
| BOOKKEEPING | | | | | | | | | |
| A | 8 | 52 | 51.5 | 48.5 | 52. | 42. | 5. | 15.9 | |
| B | 30 | 40 | 59. | 60. | 63.5 | 71. | 6.3 | 9.38 | |
| C | 17 | 66 | 77.9 | 67. | 70.5 | 55.3 | 7.6 | 15.19 | |
| D | 24 | 64 | 65.58 | 64. | 75. | 54. | 10.5 | 17.32 | |
| E | 32 | 43 | 57.9 | 58. | 64. | 50. | 7. | 10.14 | |
| F | 10 | 37 | 64.5 | 68. | 74.5 | 50. | 12.3 | 12. | |
| G | 15 | 49 | 57.06 | 59. | 65.2 | 49. | 8.1 | 15.05 | |

Table IV is read and interpreted in the same manner as Table III.

TABLE V
GROUP III CLASS MEASURES

| TYPEWRITING | | | | | | | | | |
|-------------|----|----|-------|------|------|------|------|-------|--|
| T | No | R | Ave | Med | Q3 | Q1 | Q | SD | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| A | 21 | 49 | 64.83 | 66. | 76.8 | 51.3 | 12.8 | 14.9 | |
| B | 11 | 50 | 67.45 | 71. | 73. | 57.3 | 7.9 | 12. | |
| C | 55 | 56 | 50.01 | 50. | 62.8 | 35.8 | 13.5 | 17.08 | |
| D | -- | -- | -- | -- | -- | -- | -- | -- | |
| E | 15 | 42 | 61. | 63. | 71.3 | 46.8 | 12.3 | 15.1 | |
| F | 20 | 59 | 61.5 | 63. | 72. | 49. | 11.5 | 11.96 | |
| BOOKKEEPING | | | | | | | | | |
| A | 14 | 30 | 48.78 | 48.5 | 53.5 | 42. | 5.8 | 8.5 | |
| B | -- | -- | -- | -- | -- | -- | -- | -- | |
| C | -- | -- | -- | -- | -- | -- | -- | -- | |
| D | 14 | 33 | 49.57 | 54. | 58. | 38. | 10. | 11.62 | |
| E | 12 | 34 | 46.41 | 45.5 | 50. | 38. | 6. | 9.1 | |
| F | 16 | 28 | 51.5 | 49. | 58. | 43. | 7.5 | 8.83 | |

Table V is read and interpreted in the same manner as Table III and Table IV.

TABLE VI
GROUP IV CLASS MEASURES

| TYPEWRITING | | | | | | | | | |
|-------------|----|----|-------|------|------|------|------|-------|--|
| T | No | R | Ave | Med | Q3 | Q1 | Q | SD | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| A | 22 | 55 | 64.5 | 70 | 76 | 52 | 12. | 16. | |
| B | 18 | 43 | 58.3 | 63 | 67 | 46.5 | 10.3 | 12.64 | |
| C | 11 | 62 | 61.91 | 41 | 56 | 21.5 | 17.3 | 19.92 | |
| D | 21 | 41 | 76. | 75 | 85 | 64.3 | 10.4 | 11.91 | |
| E | 16 | 38 | 69.9 | 72 | 78 | 58. | 10. | 11.49 | |
| F | 15 | 46 | 69.4 | 69.5 | 79 | 52.3 | 15.4 | 13.34 | |
| BOOKKEEPING | | | | | | | | | |
| A | 17 | 37 | 52. | 60.5 | 55.5 | 43.3 | 6.1 | 10.58 | |
| B | 18 | 43 | 42.91 | 39. | 43.5 | 33. | 5.3 | 11.7 | |
| C | 15 | 34 | 49.86 | 52. | 57.5 | 39.5 | 9. | 12.6 | |
| D | 12 | 38 | 51.41 | 51. | 59. | 39. | 10. | 11.91 | |
| E | 10 | 14 | 60.8 | 61. | 64. | 55.5 | 5.3 | 4.58 | |
| F | -- | -- | -- | -- | -- | -- | -- | -- | |

Table VI is interpreted in the same manner as is Table
III, IV, and V.

TABLE VII
GROUP V CLASS MEASURES

| TYPEWRITING | | | | | | | | | |
|-------------|----|----|-------|------|------|------|------|-------|--|
| T | No | R | Ave | Med | Q3 | Q1 | Q | SD | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| A | 35 | 63 | 74.6 | 76 | 87.8 | 62.3 | 12.8 | 16.12 | |
| B | 19 | 41 | 80.01 | 80 | 84.5 | 73.5 | 5.5 | 10.24 | |
| C | -- | -- | -- | -- | -- | -- | -- | -- | |
| D | -- | -- | -- | -- | -- | -- | -- | -- | |
| E | 21 | 34 | 79.1 | 79.5 | 87. | 89.5 | 18.8 | 10.14 | |
| BOOKKEEPING | | | | | | | | | |
| A | 36 | 64 | 65.3 | 63. | 73. | 57. | 8. | 10.24 | |
| B | -- | -- | -- | -- | -- | -- | -- | -- | |
| C | 22 | 33 | 60.4 | 59.5 | 65.5 | 54.5 | 5.5 | 9.11 | |
| D | 35 | 52 | 70.3 | 72. | 79.8 | 59.5 | 10.2 | 12.92 | |
| E | -- | -- | -- | -- | -- | -- | -- | -- | |

Table VII is interpreted in the same manner as are
Tables III, IV, V, and VI.

TABLE VIII
MEAN OF MEASUREMENTS GROUP I

| Class | R | Ave | Med | Q3 | Q1 | Q | SD |
|---------|-------|-------|-------|-------|-------|-------|-------|
| Total | 44.81 | 67.6 | 67.18 | 76.81 | 54.43 | 11.11 | 13.26 |
| Typing | 50. | 62.89 | 70.6 | 80.56 | 57.22 | 11.6 | 13.52 |
| Book'ng | 40.5 | 65.69 | 64.33 | 73.71 | 52.1 | 10.61 | 13.06 |

Table VIII is a summary of Table III, which gives the scores made in the several measurements. That is, for instance, in group I, Table III, the average of all the Ranges has been determined, giving 44.81 as a result, and next in order, the average of all the Averages has been determined with the resulting figure of 67.6, etc. The results of these can be better observed in the following charts, in which the relative achievement of the students in the various classes are presented.

TABLE IX
MEAN OF MEASUREMENTS GROUP II

| Class | R | Ave | Med | Q3 | Q1 | Q | SD |
|---------|-------|-------|-------|-------|-------|-------|-------|
| Total | 50.44 | 64.8 | 67. | 72.52 | 53.79 | 9.37 | 13.51 |
| Typing | 50.83 | 69.99 | 72.75 | 79.68 | 58. | 10.85 | 13.93 |
| Book'ng | 50.14 | 60.34 | 62.07 | 66.38 | 50.19 | 8.11 | 13.17 |

MEAN OF MEASUREMENTS GROUP III

| | | | | | | | |
|---------|-------|-------|-------|-------|-------|------|-------|
| Total | 40.11 | 55.65 | 56.66 | 63.71 | 44.25 | 9.7 | 11.87 |
| Typing | 47.2 | 60.92 | 62.6 | 71.18 | 48.04 | 11.6 | 13.81 |
| Book'ng | 31.25 | 49.06 | 49.25 | 54.37 | 39.75 | 7.32 | 9.46 |

MEAN OF MEASUREMENTS GROUP IV

| | | | | | | | |
|---------|------|-------|-------|------|-------|-------|-------|
| Total | 41. | 57.81 | 58.54 | 65.5 | 45.9 | 7.1 | 12.37 |
| Typing | 47.5 | 63.16 | 65.25 | 73.5 | 49.1 | 12.23 | 14.22 |
| Book'ng | 33.2 | 51.39 | 50.7 | 55.9 | 42.06 | 6.94 | 10.17 |

MEAN OF MEASUREMENTS GROUP V

| | | | | | | | |
|---------|-------|-------|-------|-------|-------|------|-------|
| Total | 47.8 | 71.45 | 71.66 | 79.6 | 62.7 | 8.46 | 11.95 |
| Typing | 46. | 77.9 | 78.5 | 86.43 | 68.43 | 9.03 | 12.17 |
| Book'ng | 49.66 | 65.33 | 64.83 | 72.43 | 57. | 7.9 | 11.39 |

Table IX. Mean of the Measurements of Groups II, III, IV, and V are interpreted in the same manner as Table VIII, Group I.

Chart 1, which is based on the averages of the ranges of each group, shows a relatively greater range in groups I and II, and again with group V, while groups III and IV show a much lower Range.

In Chart 2, which is based on the average of the Averages, the fact is brought out that groups I and II excelled in relative scores, and group III and IV are very low when compared with the others.

Chart 3 is based on practically the same as Chart 2, with the exception that Chart 2 is the more reliable because it is not so affected by extreme scores. This chart also brings out the fact that groups I and II are superior to III and IV, while group V is superior to all the others. Both Chart 2 and 3 are indications of the central tendency of the group.

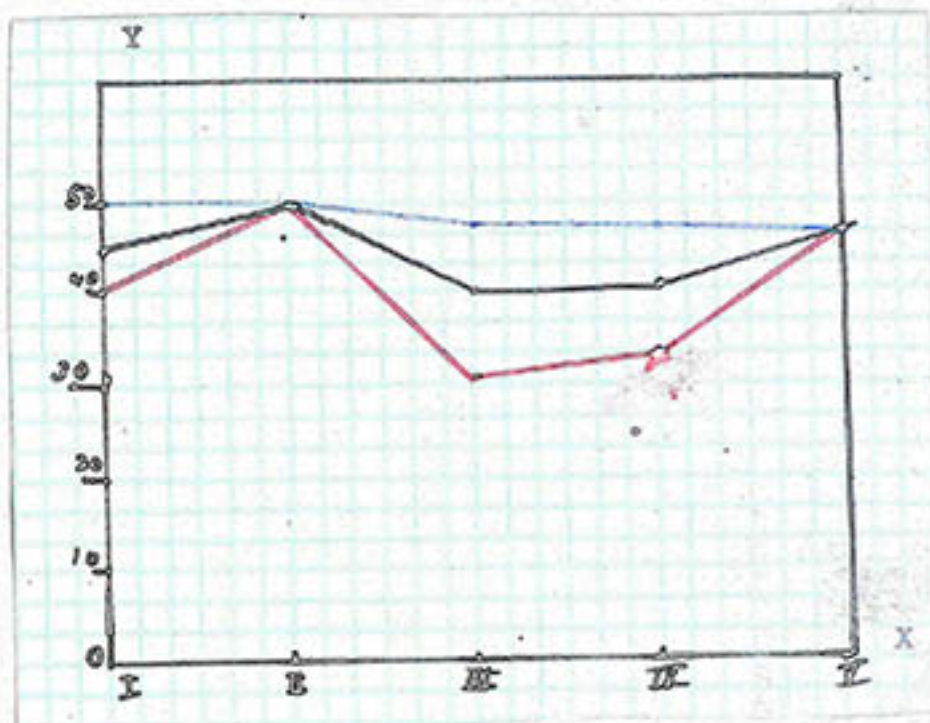


CHART I. Based on the Average of the Ranges of each group, using the averages of both typing and bookkeeping. Average of the total ranges made by students of all teachers is represented by the black line.

The Average of the Ranges made by all students of typing teachers is represented by the blue line.

The Average of the Ranges made by all students of bookkeeping teachers is represented by the red line.

The base line represents the various groups (OX), while the vertical line (OY) represents the scores.

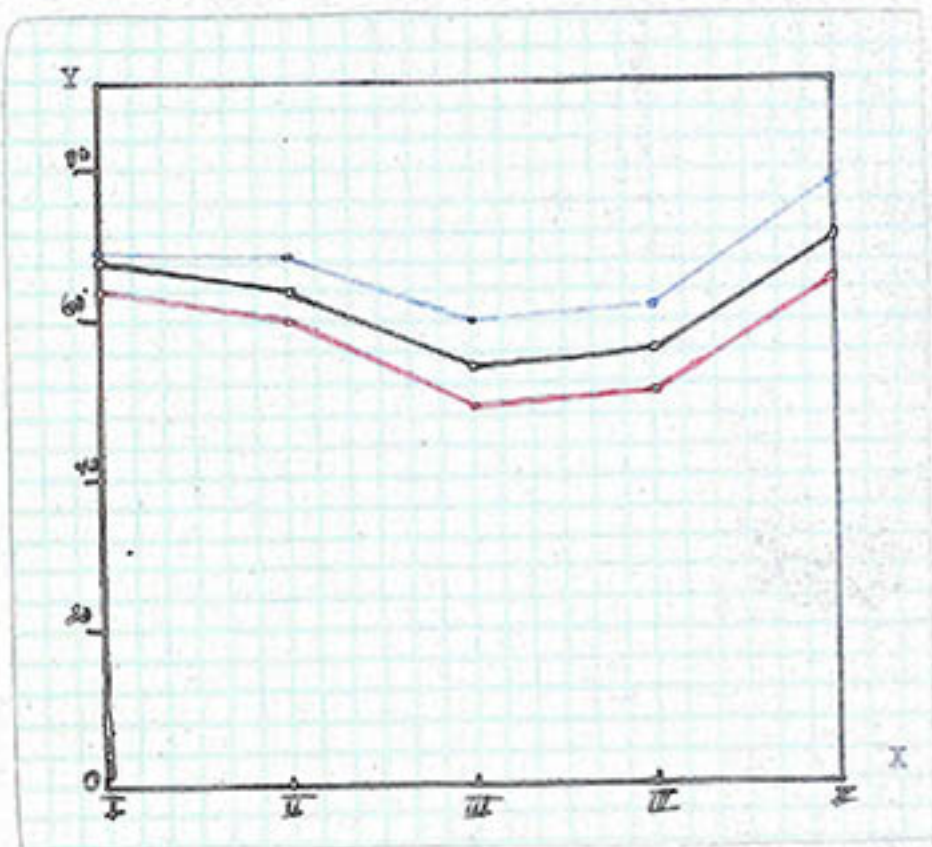


CHART 2. Based on the Average of the Averages of all scores. The Average of the Averages made by students of all teachers is represented by the black line

The Average of the Averages made by all students of typing teachers is represented by the blue line.

The Average of the Averages made by all students of bookkeeping teachers is represented by the red line.

The base line represents the various groups (OX), while the vertical line (OY) represents the scores.

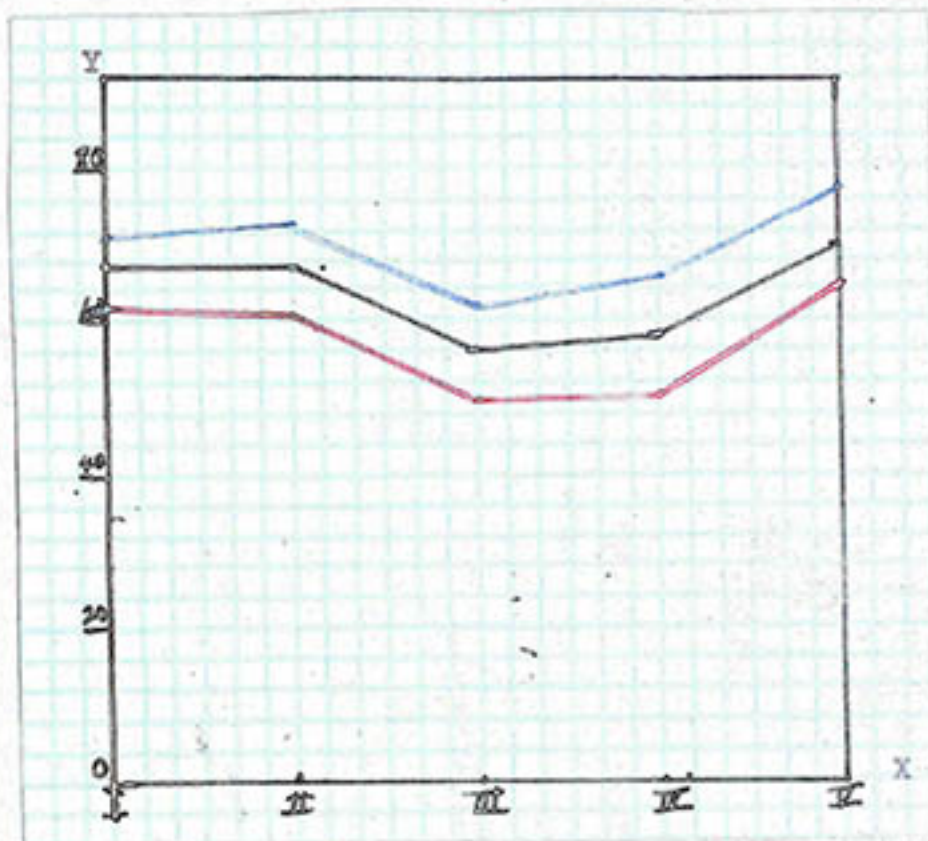


CHART 3. Based on the Average of the Medians of all scores. The Average of the Medians as made by students of all teachers is represented by the Black line.

The Average of the Medians made by all students of typing teachers is represented by the blue line.

The Average of the Medians made by all students of bookkeeping teachers is represented by the red line.

The base line represents the various groups (OX), while the vertical line (OY) represents the scores.

Chart 4 indicates the relative position of the upper quartile, or the point at which 25% of the students are above and 75% below in scoring rank. This affords an immediate view of certain parts of each group score. It seeks to give to the reader a view of the relative position of those higher in the scoring rank. The writer wishes to point out that while the difference is perhaps not so noticeable, yet it is obvious that again Group V, which is represented at the extreme right of the chart, is superior in achievement when taken as a whole than are any of the others, while the same ratio holds true in that Group I seems to be a trifle better than Group II, and with very little difference between Groups III and IV.

Very little need be said of Chart 5. This is a view of the lower end of the scores in each group. In this case only 25% of the cases are below this score, and all that the writer wishes to have noted here, is the fact that the same relation holds true here with very little variation; that is, Groups I, II, and IV are best.

Charts 6 and 7 are alike in that they give an index of the central tendency, that is, of the number of scores which are grouped around the median. Chart 6 shows the relative amounts of Q , which is the difference between Q_3 and Q_1 , divided by two. In other words, if the scores are scattered over a large area the position of the group on the chart will be high; if the scores are closely grouped together they will occupy a low position on the chart.

Chart 7, like chart 6, is an indication of the central tendency. It is an indication of the number of scores which are

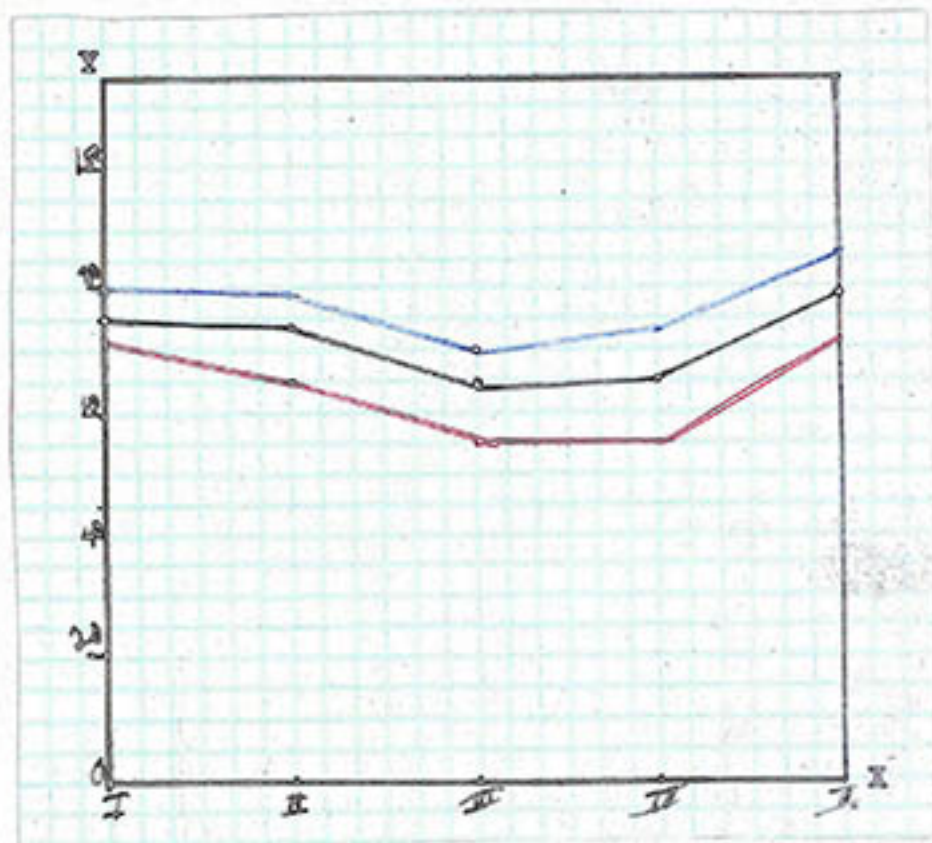


CHART 4. Based on the Average of the Q3's of all scores.

The Average of the Q3's as made by students of all teachers is represented by the black line.

The Average of the Q3's as made by all students of typing teachers is represented by the blue line.

The Average of the Q3's as made by all students of book-keeping teachers is represented by the red line.

The base line (OX) represents the various groups, while the vertical line (OY) represents the scores.

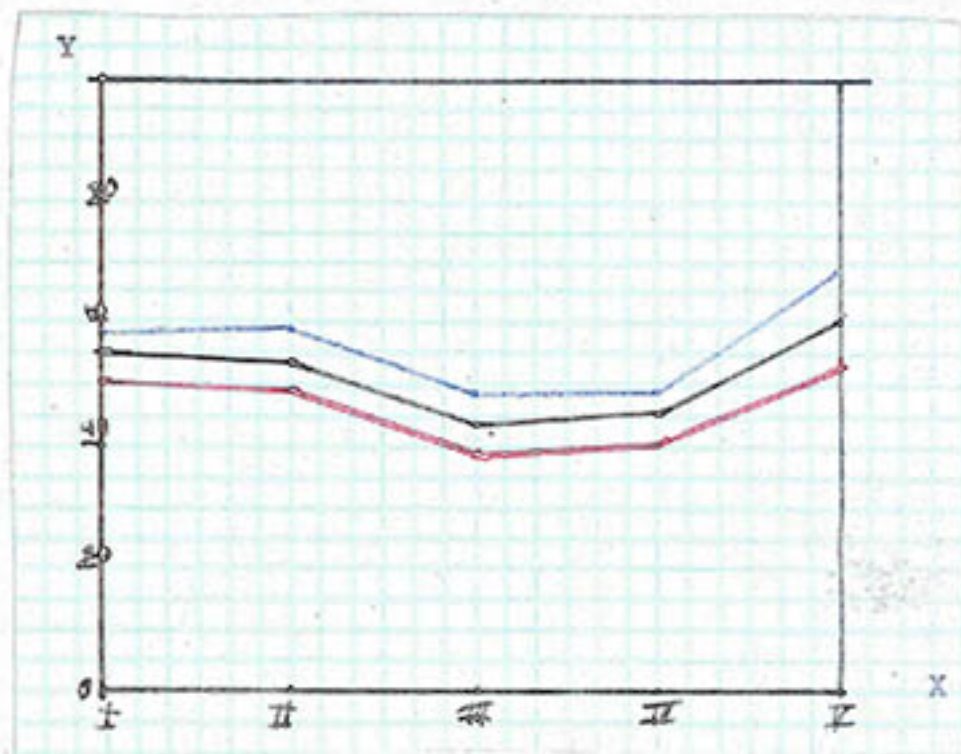


CHART 5. Based on the Average of the Q1's of all scores.

The Average of the Q1's as made by students of all teachers is represented by the black line.

The Average of the Q1's as made by all students of typing teachers is represented by the blue line.

The Average of the Q1's as made by all students of book-keeping teachers is represented by the red line.

The base line represents the various groups (OX), while the vertical line (OY) represents the scores.

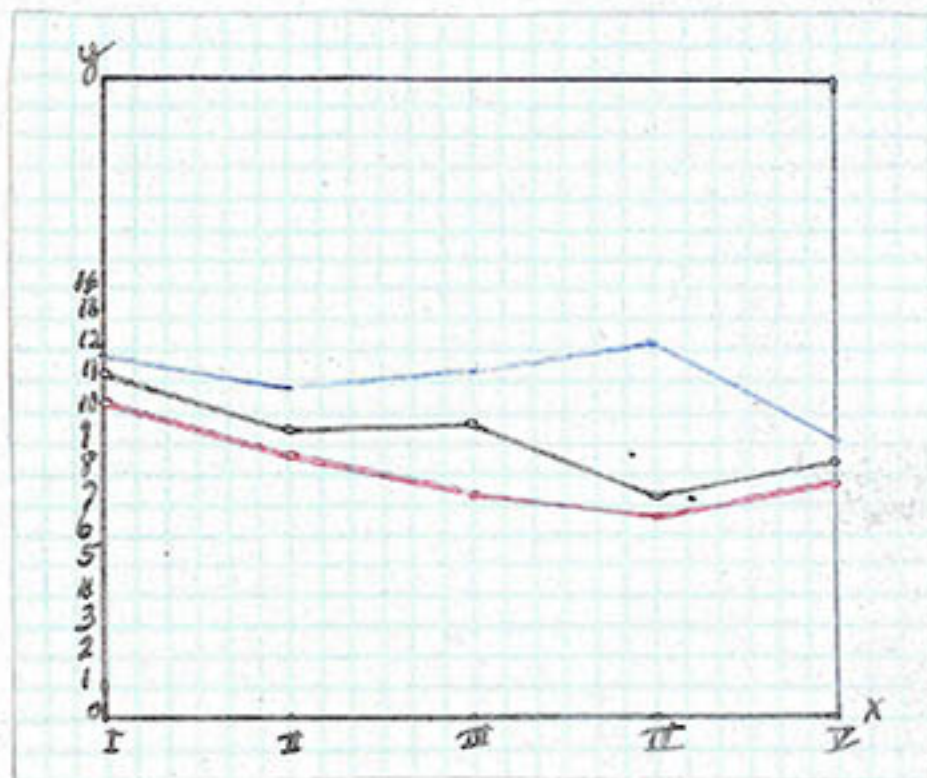


CHART 6. Based on the Average of the Q's of all scores.

The Average of the Q's as made by students of all teachers is represented by the black line.

The Average of the Q's as made by all students of typing teachers is represented by the blue line.

The Average of the Q's as made by all students of book-keeping teachers is represented by the red line.

The base line (OX) represents the various groups, while the vertical line (OY) represents the scores.

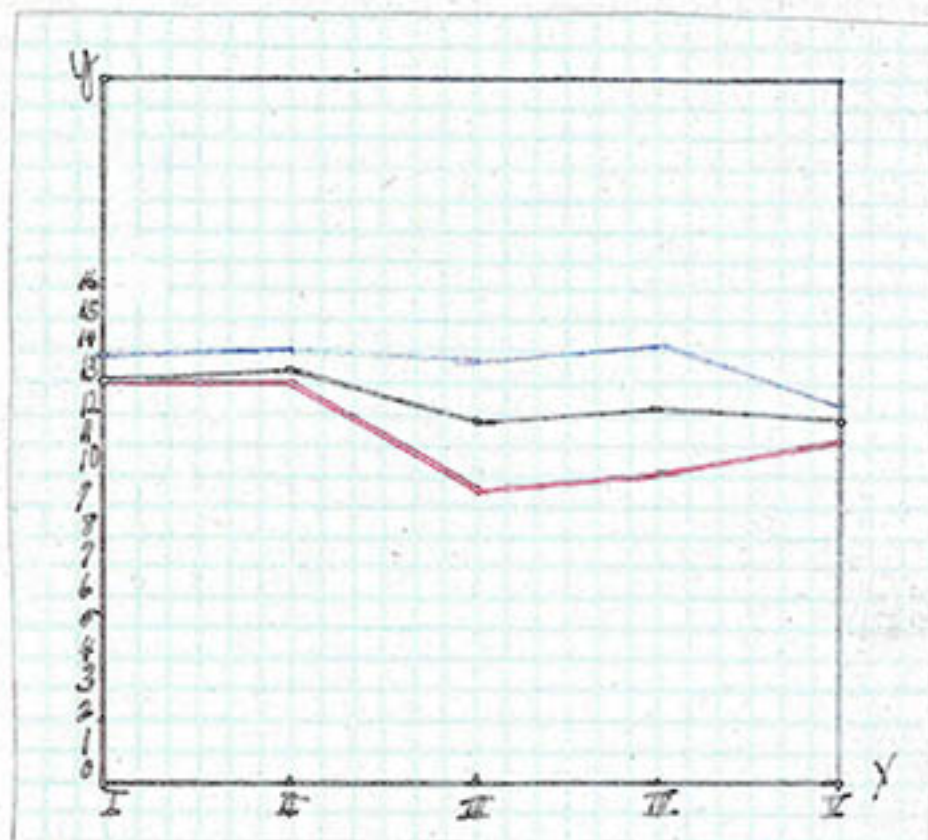


CHART 7. Based on the Average of the SD of all scores.

The Average of the SD's made by students of all teachers is represented by the black line.

The Average of the SD's made by all students of typing teachers is represented by the blue line.

The Average of the SD's made by all students of book-keeping teachers is represented by the red line.

The base line (OX) represents the various groups, while the vertical line (OY) represents the scores.

found closely grouped around the average and does not take into consideration those few scores both at the upper and lower ends of the series. If the scores follow the normal distribution curve, approximately 68.26% of the total scores will be found in this measure.

Now as to what relation these varying degrees of achievement have to the training and experience of the teacher the writer will now point. By again referring to the definition of the various classifications into which the teachers were placed on page 15 the reader will readily see that the better trained teachers have better results in their schools in the way of achievement.

TABLE X
MEASURES COMPUTED ON GROUP DISTRIBUTION IN
TYPEWRITING

| Group | N | Ave | SD | O Ave |
|-------|-----|-------|-------|--------|
| I | 129 | 68.4 | 16.91 | 1.4976 |
| II | 105 | 70.23 | 16.49 | 1.6092 |
| III | 102 | 59.18 | 13.30 | 1.5341 |
| IV | 103 | 65.58 | 16.99 | 1.6741 |
| V | 75 | 77.73 | 13.64 | 1.5751 |

The results of this table have been obtained by treating each group as a separate distribution from raw scores in appendix, using the scores made by pupils of the various teachers within each group in typewriting.

The first column represents the different groups of classification, the second column headed N is the number of students taught by the teachers in each group, column three is the average score made within each group, column four is the Standard Deviation of the Averages. Thus, beginning at the upper left hand corner, Group I contained a total number of 129 students, the average score made by this group was 68.4, the Standard Deviation of the group was 16.91, and the Standard Deviation of the Averages was 1.4976.

TABLE XI
MEASURES COMPUTED ON GROUP DISTRIBUTION IN
BOOKKEEPING

| Group | N | Ave | SD | O Ave |
|-------|-----|---------|-------|--------|
| I | 84 | 67.1 | 15.64 | 1.4888 |
| II | 136 | 61.086 | 19.61 | 1.6815 |
| III | 56 | 49.4463 | 9.75 | 1.3002 |
| IV | 72 | 50.58 | 16.65 | 1.9622 |
| V | 95 | 55.43 | 15.38 | 1.5923 |

The results given in this table have been obtained by treating each group as a separate distribution, using the scores made by pupils of the various teachers within each group in bookkeeping, and is interpreted in the same manner as Table X.

TABLE XII
MEASURES OF COMPARISON WITHIN EACH GROUP
IN TYPEWRITING

| Group | N | Ave | SD | O Ave |
|-------|---|-------|--------|--------|
| I | 5 | 69.89 | 6.75 | 3.1082 |
| II | 7 | 69.99 | 10.55 | 3.967 |
| III | 5 | 60.92 | 5.925 | 2.6498 |
| IV | 6 | 63.16 | 11.045 | 4.51 |
| V | 3 | 77.9 | 2.365 | 1.3654 |

The results given in Table XII are obtained from data in Tables III, IV, V, VI, and VII on typewriting scores. This table differs from Tables X, and XI in that the second column, headed N, is the number of teachers within each group and the column headed Ave is the Average of the Averages given in Tables III, IV, V, VI, and VII.

Table XII is read in the following manner. Beginning at the upper left hand corner, Group I contained 5 teachers, the average score made by the five teachers in Group I was 69.89, the Standard Deviation was 6.75, and the Standard Deviation of the Average was 3.1082.

TABLE XIII
MEASURES OF COMPARISON WITHIN EACH GROUP IN
BOOKKEEPING

| Group | N | Ave | SD | O Ave | |
|-------|---|-------|--------|--------|--|
| I | 6 | 55.69 | 6.22 | 2.539 | |
| II | 7 | 60.34 | 6.0088 | 3.0284 | |
| III | 4 | 49.08 | 1.8355 | .9275 | |
| IV | 5 | 51.39 | 5.39 | 2.41 | |
| V | 3 | 55.33 | 4.041 | 2.3331 | |

The data given in Table XIII were obtained from Tables III, IV, V, VI, and VII and refer to bookkeeping scores. The Table is interpreted in the same manner as Table XII.

TABLE XIV

COMPARISONS BASED ON RESULTS IN TABLE X

| Groups | Ave Diff | o Diff | $\frac{D}{O \text{ Diff}}$ | Chances in 100 |
|---|----------|--------|----------------------------|-------------------|
| 1 Step difference in training and experience. | | | | |
| V--I | 9.335 | 2.1722 | 4.3 | 100 |
| I--II | 1.85 | 2.194 | .84 | 80 |
| II--III | 11.07 | 2.22 | 4.98 | 100 |
| III--IV | 6.40 | 2.23 | 2.83 | 99.75 |
| Average of 1 Step difference | | | 3.24 | 100 |
| 2 Step difference | | | | |
| V--I | 7.483 | 2.25 | 3.32 | 100 |
| I--III | 9.22 | 2.1408 | 4.31 | 100 |
| II--IV | 4.67 | 2.31 | 2.02 | 98 |
| Average of 2 Step difference | | | 3.22 | 100 |
| 3 Step difference | | | | |
| V--III | 18.553 | 2.1997 | 8.43 | 100 |
| I--IV | 2.82 | 2.243 | 1.26 | 89 |
| Average of 3 Step difference | | | 4.85 | 100 |
| 4 Step difference | | | | |
| V--IV | 12.153 | 2.299 | 5.28 | 100 |

Table XIV is a summary of the difference discovered between the groups of teachers according to step difference in training and experience. The table is read as follows. Beginning at the upper left hand corner we have first the one step difference group, the first column headed Group, being the column showing the groups with one step difference, the second column headed Ave Diff shows the difference in the averages of the two, the third, headed O Diff

is the Standard Deviation of the difference, Column four, headed

$\frac{D}{\sigma_{DIFF}}$ is the Standard Deviation of the Averages, while the last column, headed Chances in 100 show the number of chances in 100 that the results will always be in favor of the group having the largest average.

TABLE XV

COMPARISONS BASED ON RESULTS IN TABLE XI

| Group | Ave Diff | o Diff | $\frac{D}{o \text{ Diff}}$ | Chances in 100 |
|---|----------|--------|----------------------------|----------------|
| 1 Step difference in training and experience. | | | | |
| V--I | .67 | 2.17 | .31 | 62 |
| I--XI | 6.034 | 2.2418 | 2.69 | 99.7 |
| II--III | 11.62 | 2.1248 | 5.43 | 100 |
| III--IV | 1.15 | 1.98 | .6 | 73 |
| Average of 1 step differences | | | 2.27 | 98.9 |
| 2 Step difference | | | | |
| V--II | 5.564 | 2.31 | 2.32 | 98.9 |
| I--III | 17.65 | 1.97 | 8.93 | 100 |
| II--IV | 10.48 | 2.16 | 4.85 | 100 |
| Average of two step differences | | | 5.38 | 100 |
| 3 Step difference | | | | |
| V--III | 16.98 | 2.05 | 8.28 | 100 |
| I--IV | 16.52 | 2.01 | 8.21 | 100 |
| Average of 3 step differences | | | 8.25 | 100 |
| 4 Step difference | | | | |
| V--IV | 15.85 | 2.09 | 7.58 | 100 |

Table XV is interpreted in the same manner as is

Table XIV.

TABLE XVI

43.

COMPARISONS BASED ON RESULTS IN TABLE XII.

| Groups | Ave Diff | o Diff | $\frac{D}{o \text{ Diff}}$ | Chances in 100 |
|---|----------|--------|----------------------------|-------------------|
| One Step difference in training and experience. | | | | |
| V--I | 8.01 | 3.392 | 2.36 | 99 |
| I--II | .1 | 5.054 | .019 | 50 |
| II--III | 9.07 | 4.788 | 1.89 | 97 |
| III--IV | 2.94 | 5.231 | .428 | 83 |
| Average of one step difference | | | 1.174 | 87 |
| Two Step difference | | | | |
| V--II | 7.91 | 4.215 | 1.87 | 96 |
| I--III | 8.97 | 4.084 | 2.19 | 98.6 |
| II--IV | 6.85 | 6.019 | 1.13 | 87 |
| Average of two step difference | | | 1.75 | 96 |
| Three Step difference | | | | |
| V--III | 16.98 | 2.98 | 5.69 | 100 |
| I--IV | 6.73 | 5.477 | 1.228 | 89 |
| Average of three step difference | | | 3.509 | 100 |
| Four Step difference | | | | |
| V--IV | 14.74 | 4.714 | 3.12 | 100 |

Table XVI is interpreted in the same manner as are
Tables XIV and XV.

TABLE XVII

COMPARISONS BASED ON RESULTS IN TABLE XIII

| Groups | Ave Diff | o Diff | $\frac{D}{o \text{ Diff}}$ | Chances in 100 |
|---|----------|--------|----------------------------|-------------------|
| One Step Differences in training and experience | | | | |
| V--I | .36 | 3.449 | .104 | 54 |
| I--II | 5.35 | 3.949 | 1.354 | 91 |
| II--III | 11.28 | 3.162 | 3.569 | 100 |
| III--IV | 2.33 | 2.592 | .903 | 82 |
| Average of one step differences | | | 1.483 | 93 |
| Two Step difference | | | | |
| V--II | 4.99 | 3.819 | 1.306 | 90 |
| I--III | 16.63 | 2.7 | 6.159 | 100 |
| II--IV | 8.95 | 3.868 | 2.31 | 98.9 |
| Average of two step difference | | | 3.258 | 100 |
| Three Step difference | | | | |
| V--III | 16.27 | 2.51 | 6.48 | 100 |
| I--IV | 14.30 | 3.501 | 4.085 | 100 |
| Average of three step difference | | | 5.283 | 100 |
| Four Step difference | | | | |
| V--IV | 13.94 | 3.352 | 4.16 | 100 |

Table XVII is interpreted in the same manner as is

Table XVI.

CHAPTER IV

SUMMARY OF DATA

In way of summary this Survey is based on the Relation of Training and Experience of the Teacher of Commercial Classes to the Achievement of the Pupils Enrolled in These Classes. This has been carried on by means of comparisons in achievement between groups of pupils taught by teachers who had prepared themselves differently for the work of teaching. Let us call these groups of pupils which were each taught by different teachers, pupil groups or rather teacher groups. The classification of these teacher groups is based on preparation of the teacher in the way of training and experience in five main groups as follows:

(1) Group one (I) is composed of those teachers who are teaching in their field of major work, and who have had three years or more of practical experience in the field of teaching.

(2) Group two (II) is composed of those teachers who are teaching in their field of major work, but limited to from one to three years experience in the field of teaching.

(3) Group three (III) is composed of those teachers who are teaching in their field of minor work, with experience limited from one to four years.

(4) Group four (IV) is composed of those teachers who are teaching in neither their minor nor major field, but who have supplemented their education with business college education, with one to four years experience in teaching.

(5) Group five (V) is composed of those teachers who are teaching in their field of major work, with unlimited experience and none less than four years, and who have either a Master's of Science Degree or lack only a few hours of work for its completion.

In generalizing from the data obtained the following conclusions have been reached:

(1) Differences are noted in the achievement of the groups in direct proportion to the difference in training and experience of the teacher of the group;

(2) Group V, which is the group composed of the most highly trained teachers, made the highest average score, 71.45, a score which is 3.85 points above the next highest;

(3) Group I composed of the next in rank of prepared teachers made an average score of 67.6, 3.85 points below group V, or 2.8 above the next highest;

(4) Group II composed of teachers with the same training as Group I, but with a lower average number of years experience ranked third highest with an average score of 64.8, or 2.8 points below the next highest;

(5) Group IV, composed of those teachers with the least training for teaching, but with supplementary training in business college, ranked fourth with an average score of 57.81 or 6.929 points below the next highest average score. The general average of this group was considerably improved by the unusually good scores of pupils of one teacher in this group who had con-

siderable office work training;

(6) Group III averaged the lowest score of the five, having a score of 55.65, which is 2.16 points below the next highest and 15.8 points below the highest average score for all groups;

(7) In treating the total scores within a group as a distribution we find the following to be the order and magnitude of the respective averages in typewriting classes. A. Group V received the highest average with a score of 77.733; B. Group II received the next highest average with a score of 70.25; C. Group I received the next highest average with a score of 68.4; D. Group IV received next highest with a score of 65.59; and E. Group III was lowest with a score of 59.18;

(8) In treating scores within a group as a distribution in like manner we find the following to be the order and magnitude of the respective averages in bookkeeping classes. A. Group I received the highest average with a score of 67.1; B. Group V was next highest with an average score of 63.45; C. Group II was next highest with an average of 61.066; D. Group IV was next highest with an average score of 50.56; while E. Group III was lowest scoring as an average, 49.4465.

the significance and reliability of these differences has been pointed out in Tables X to XVII inclusive. The following is a summary of these results.

TABLE XVIII

| Step Diff | Ave $\frac{D}{\sigma \text{ Diff}}$ | Chance in 100 |
|--|-------------------------------------|---------------|
| Summary of student distribution in Typewriting | | |
| 1 | 3.24 | 100 |
| 2 | 3.22 | 100 |
| 3 | 4.85 | 100 |
| 4 | 5.28 | 100 |
| Summary of student distribution in Bookkeeping | | |
| 1 | 2.87 | 98.9 |
| 2 | 5.38 | 100 |
| 3 | 6.25 | 100 |
| 4 | 7.58 | 100 |
| Summary of teacher distribution in Typewriting | | |
| 1 | 1.174 | 87 |
| 2 | 1.73 | 96 |
| 3 | 3.508 | 100 |
| 4 | 3.12 | 100 |
| Summary of teacher distribution in Bookkeeping | | |
| 1 | 1.483 | 95 |
| 2 | 3.258 | 100 |
| 3 | 5.283 | 100 |
| 4 | 4.16 | 100 |

This Table shows that when the actual difference between means is given, and also the Standard Deviation of the difference, then, to find the chances of a true difference greater than zero, simply divide the difference by the $\sigma \text{ Diff}$. If this result exceeds 3 then we have complete reliability.

CONCLUSIONS

(1) The facts presented in this thesis seem to indicate that we can expect pupils who are under the care and direction of highly skilled and able teachers to do better work than those under the care and direction of teachers with less training and experience.

(2) When the difference in training and experience of the instructor has not been so marked, there was not the marked cleavage in the average scores, but as the differences between the training and experience of the various teachers grew more noticeable the scores were markedly different, the better prepared teachers having the student groups with the higher average scores.

(3) The fact that the group which had to some degree, supplementary work in business colleges surpassed the group with corresponding work in a teachers college indicates that there is an advantage in the commercial teacher taking supplementary work in some special field.

(4) In general, as the number of steps difference in training and experience of the teachers increased, the difference between the achievement of the student groups increased. There was the least difference in groups of one step difference, but the greatest difference was not noted in the groups with the greatest number of step difference, but so nearly so that the margin of difference was not significant, being only 73 chances in 100, whereas nearly all other comparisons showed a reliability of 99 or 100, or complete reliability.

BIBLIOGRAPHY

Allen, George A. Kansas Educational Directory. Topeka,
Kansas State Printing Plant, 1931. 52p.

Useful in securing names of Superintendents and
Principals of Kansas high schools

Almoeck, John C. Research and Thesis Writing. Boston,
Houghton Mifflin Company, 1930. 310p.

Especially good information on the construction
and mechanics of thesis work.

Elwell, Payette H., and Toner, James V. Bookkeeping and
Accounting Elementary Course. Boston, Ginn and Com-
pany, 1926. 352p.

Useful in preparation of bookkeeping tests.

Elwell, Payette H., and Toner, James V. Bookkeeping Tests.
Boston, Ginn and Company, 1927. 48p.

Teachers edition to accompany Bookkeeping and Account-
ing. Useful in construction of tests.

Pink, E. L. Commercial Teachers and Commercial Education
in Kansas High Schools. Master's Thesis, University of
Kansas, 1931. 34p.

Contains data useful to the carrying out of the
work in the field of the writer.

Garrett, Henry E. Statistics in Psychology and Education.

New York, Longmans, Green and Company, 1926. 317p.

Useful in compiling the data of this thesis.

Herrick, A. Cheesman. Meaning and Practice of Commercial

Education. New York, The MacMillan Company, 1904.

378 p.

Contains an article on the stressing of need for commercial education on page 3, mentions changes that seem to be needed and value of each on page 31.

Kendel, I. L. Educational Yearbook of the International

Institute of Teachers College Columbia University.

New York, Teachers College, Columbia University, 1928.

606p.

Article on the problem of teacher training in the United States p. 569.

Mc Call, William A. How to Experiment in Education. New

York, the MacMillan Company, 1926. 281p.

Useful in making comparisons in presentation of data.

Miller, Keith W. Bookkeeping and Accounting Tests. Chicago,

Lyons and Gernsheim, 1930. 12p.

Used in constructing tests.

National Education Association of the United States. Proceedings of the 89th Annual Meeting Held at Los Angeles, California. Washington, D. C., National Education Association, 1931. 1200p.

Articles on business education and commercial guidance pp. 102, 105, and 345.

National Education Association of the United States. Proceedings of the 88th Annual Meeting Held at Columbus, Ohio. Washington, D. C., National Education Association, 1931. 1152p.

Article on the standardization of schools p. 280, and on definitions of typing and trends in commercial teaching on pp. 289, and 291.

Sorelle, Rupert P. The New Rational Typewriter. New York, The Gregg Publishing Company, 1926. 164p.

Useful in constructing typing tests.

Stuart, Este Ross. The Stuart Objective Tests in Typewriting. New York, The Gregg Publishing Company, 1929. 35p.

Useful in constructing typewriting tests.

Taintor, Sarah Augusta. Training for Secretarial Practice. New York, McGraw-Hill Book Company, Inc., 1923. 298p.

Discussion of the needs of secretarial work. Kind of training needed to achieve this end. Duties.

APPENDIX

TRAINING AND EXPERIENCE FOR COMMERCIAL TEACHERS

Date _____

Location _____ Age _____ Sex _____ Nationality _____
Home _____

HOME ----- HIGH SCHOOL AND COLLEGE TRAINING

| Where | When | Degree | Major | Minor |
|-------|------|--------|-------|-------|
|-------|------|--------|-------|-------|

SYNOPSIS COLLEGE

COLLEGE OR UNIVERSITY

TRAINING FOR COMMERCIAL TEACHERS

| CREDIT | SCHOOL | INCLUSIVE DATES | TIME SPENT |
|--------|--------|-----------------|------------|
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |
| 10 | 10 | 10 | 10 |
| 11 | 11 | 11 | 11 |
| 12 | 12 | 12 | 12 |
| 13 | 13 | 13 | 13 |
| 14 | 14 | 14 | 14 |
| 15 | 15 | 15 | 15 |
| 16 | 16 | 16 | 16 |
| 17 | 17 | 17 | 17 |
| 18 | 18 | 18 | 18 |
| 19 | 19 | 19 | 19 |
| 20 | 20 | 20 | 20 |
| 21 | 21 | 21 | 21 |
| 22 | 22 | 22 | 22 |
| 23 | 23 | 23 | 23 |
| 24 | 24 | 24 | 24 |
| 25 | 25 | 25 | 25 |
| 26 | 26 | 26 | 26 |
| 27 | 27 | 27 | 27 |
| 28 | 28 | 28 | 28 |
| 29 | 29 | 29 | 29 |
| 30 | 30 | 30 | 30 |
| 31 | 31 | 31 | 31 |
| 32 | 32 | 32 | 32 |
| 33 | 33 | 33 | 33 |
| 34 | 34 | 34 | 34 |
| 35 | 35 | 35 | 35 |
| 36 | 36 | 36 | 36 |
| 37 | 37 | 37 | 37 |
| 38 | 38 | 38 | 38 |
| 39 | 39 | 39 | 39 |
| 40 | 40 | 40 | 40 |
| 41 | 41 | 41 | 41 |
| 42 | 42 | 42 | 42 |
| 43 | 43 | 43 | 43 |
| 44 | 44 | 44 | 44 |
| 45 | 45 | 45 | 45 |
| 46 | 46 | 46 | 46 |
| 47 | 47 | 47 | 47 |
| 48 | 48 | 48 | 48 |
| 49 | 49 | 49 | 49 |
| 50 | 50 | 50 | 50 |
| 51 | 51 | 51 | 51 |
| 52 | 52 | 52 | 52 |
| 53 | 53 | 53 | 53 |
| 54 | 54 | 54 | 54 |
| 55 | 55 | 55 | 55 |
| 56 | 56 | 56 | 56 |
| 57 | 57 | 57 | 57 |
| 58 | 58 | 58 | 58 |
| 59 | 59 | 59 | 59 |
| 60 | 60 | 60 | 60 |
| 61 | 61 | 61 | 61 |
| 62 | 62 | 62 | 62 |
| 63 | 63 | 63 | 63 |
| 64 | 64 | 64 | 64 |
| 65 | 65 | 65 | 65 |
| 66 | 66 | 66 | 66 |
| 67 | 67 | 67 | 67 |
| 68 | 68 | 68 | 68 |
| 69 | 69 | 69 | 69 |
| 70 | 70 | 70 | 70 |
| 71 | 71 | 71 | 71 |
| 72 | 72 | 72 | 72 |
| 73 | 73 | 73 | 73 |
| 74 | 74 | 74 | 74 |
| 75 | 75 | 75 | 75 |
| 76 | 76 | 76 | 76 |
| 77 | 77 | 77 | 77 |
| 78 | 78 | 78 | 78 |
| 79 | 79 | 79 | 79 |
| 80 | 80 | 80 | 80 |
| 81 | 81 | 81 | 81 |
| 82 | 82 | 82 | 82 |
| 83 | 83 | 83 | 83 |
| 84 | 84 | 84 | 84 |
| 85 | 85 | 85 | 85 |
| 86 | 86 | 86 | 86 |
| 87 | 87 | 87 | 87 |
| 88 | 88 | 88 | 88 |
| 89 | 89 | 89 | 89 |
| 90 | 90 | 90 | 90 |
| 91 | 91 | 91 | 91 |
| 92 | 92 | 92 | 92 |
| 93 | 93 | 93 | 93 |
| 94 | 94 | 94 | 94 |
| 95 | 95 | 95 | 95 |
| 96 | 96 | 96 | 96 |
| 97 | 97 | 97 | 97 |
| 98 | 98 | 98 | 98 |
| 99 | 99 | 99 | 99 |
| 100 | 100 | 100 | 100 |

PING
ND
CS
EOG.
HIP

| SCHOOL | | TEACHING EXPERIENCE | |
|----------|-------|---------------------|-------------------|
| COND. BY | WHERE | INCLUSIVE DATES | DEPARTMENT TAUGHT |
| | | | |

CH SCHOOLS

UNIOR COLLEGE OR BUSINESS COLLEGE

| IS NOW TEACHING | DATE ON PRESENT POSITION | NUMBER IN CLASS | HRS. PER WEEK |
|-----------------|--------------------------|-----------------|---------------|
| | | | |

April 8, 1932
Hays, Kansas

II

Instructors of Commerce
in Schools of Kansas

Instructors:

I wish to thank you for your consideration in offering to co-operate with me in carrying on work on my Master's Degree Thesis on the "Evaluation of Training and Experience of the Instructor to Pupil Placement" in the Commercial Departments of the High Schools of Eastern Kansas, by administering to your Commercial classes certain tests which were to be furnished by me. I am enclosing, with this letter, tests in Bookkeeping I and in Typing I for you to present to your classes as a part of this project.

I wish to offer the following suggestions for the administering of these tests: In the Typing test which is to be given to only students beginning typing, presumably finishing their first year, I suggest that the student be first given an opportunity to read the test over to detect any defect in the copy. Then he is to be given ten (10) minutes each for two trials on Part I. This shall be double-spaced, with margins set at 10 and 75. Part II is merely a problem on the centering of the parts (1) and (2) at the top of a page as a title. Part III is a section devoted to the parts of the machine. These parts mentioned to be described by position or function. All this is to be written on the typewriter, the whole test to be completed in forty (40) minutes, with time out for instructions. If there are not sufficient tests enclosed for all the class members, please arrange for those tested to fairly represent the group.

Concerning the Bookkeeping test, it also is to be given only to students of beginning Bookkeeping. The test is designed to cover the subject matter and application of the first year's work, and should be completed in forty (40) minutes' time. I believe the directions given at the beginning of each part are self explanatory but it might be well to check over these with the class as a whole before the test is given in order that there be no disorder during the test. No answers to this test are, of course, to be written in the spaces provided on the sheets. I might suggest that only sharp lead pencils be used in this test.

While these few suggestions are probably unnecessary, they might help to clear up a point or two concerning the tests. I am enclosing with this, address stickers, in order that the same envelope may be used in returning the tests' results. I would only like to suggest that these be administered and returned as speedily as possible in order that I may check the answers and send to you a summary of my findings in this project. I again wish to thank you for your past and future consideration and co-operation, and remain

Very truly yours,

321 West 8th Street
Hays, Kansas

ACCOUNTING TEST CLASSIFICATION PART I

Name _____

DIRECTIONS: Classify each account by writing the appropriate number in the parentheses at the left of the account given.

- | | |
|--|---|
| 1. Current Assets | 12. Income, Profit or Gain operating income |
| 2. Fixed Assets. | 13. Non-operating Income. |
| 3. Accrued Income or Asset. | 14. Expense, Cost or Loss |
| 4. Deferred Asset. | 14a. Trading Expense Operating |
| 5. Intangible Asset. | 14b. Administration Expenses |
| 6. Current Liability | 15. Non-operating Expense. |
| 7. Fixed Liability | 16. Valuation account or minus on asset. |
| 8. Accrued Expense or Liability | 17. Minus expense or cost. |
| 9. Contingent Liability | 18. Minus on income or a gain account. |
| 10. Proprietary Interest Proprietorship | |
| 11. Profit and Loss Suspense Account. | |
| () 1. D. E. Brown, Investment. | () 37. Depreciation on Bldg. & Fixture |
| () 2. Office Supplies Inventory | () 38. Acc. Int. on Notes Rec. |
| () 3. Furniture & Furnishings. | () 39. Sales Department Salaries. |
| () 4. Cash. | () 40. Accounts Payable. |
| () 5. Trade Acceptance Payable | () 41. Office Salaries. |
| () 6. Misc. Purchases | () 42. Traveling Salesmen's Expense. |
| () 7. Collection and Exchange. | () 43. Loss on Replacement of Fixed Assets. |
| () 8. Misc. Sales | () 44. Reserve for Bad Debts. |
| () 9. Petty Cash. | () 45. Purchases Returns & Allowance |
| () 10. Cash over and under. | () 46. Reserve for Depreciation on Buildings and Fixtures. |
| () 11. Notes Payable. | () 47. Good Will. |
| () 12. Fuel Inventory. | () 48. Delivery Equipment. |
| () 13. Bad Debts. | () 49. Undivided Profits. |
| () 14. Land. | () 50. Copyright. |
| () 15. Interest Income. | () 51. Surplus. |
| () 16. Carriage Out. | () 52. Franchise. |
| () 17. Notes Receivable. | () 53. Accrued Property Taxes. |
| () 18. D. E. Brown, Drawings. | () 54. Notes Receivable Discounted. |
| () 19. Heat. | () 55. Dividend Payable. |
| () 20. Accrued Salaries. | () 56. Capital Surplus. |
| () 21. Unexpired Insurance. | () 57. Depreciation. |
| () 22. Notes Receivable Discounted | () 58. Accrued Sales Salaries. |
| () 23. Interest Expense. | () 59. Subscriptions Receivable. |
| () 24. Light. | () 60. Mortgage Payable. |
| () 25. Buildings & Fixtures. | () 61. Prepaid Interest Expense. |
| () 26. Misc. Discount on Purchases | () 62. Prepaid Insurance. |
| () 27. Office Supplies. | () 63. Bonds Payable. |
| () 28. Accounts Receivable. | () 64. Interest Receivable on bank balances. |
| () 29. Accrued Interest on Notes Payable. | () 65. Advances to Employees. |
| () 30. Trade Acceptances Receivable. | () 66. Pending Lawsuit. |
| () 31. Accrued Expenses. | () 67. U. S. Bonds. |
| () 32. Insurance. | () 68. Prepaid Insurance. |
| () 33. Sundry General Expense. | () 69. Sales Returns & Allowances. |
| () 34. Misc. Inventory Fixed. | () 70. Fuel Inventory. |
| () 35. Misc. Discount on Sales. | |
| () 36. Traveling Salesmen's Salary. | |

PART II

Name

IV

DIRECTIONS: If you think the statement is true put a plus (+) mark in the space provided. If false place a minus (-) mark there.

- () 1. Salaries is debited when cash is paid out for building use.
- () 2. The balance sheet shows the total figures from all ledger account
- () 3. The ledger is closed each day at the end of business hours.
- () 4. Fuel Inventory is an asset account.
- () 5. Interest income is debited for payments for interest received.
- () 6. All cash transactions are usually recorded in a cash journal.
- () 7. Banks will not honor checks with only typewritten signatures.
- () 8. A purchase order is an invoice of goods sold.
- () 9. Entries in the Merchandise Discount On Sales account are credits.
- () 10. Payment upon presentation is a means of dishonoring a draft.
- () 11. A draft payable "10 days after sight" is a sight draft.
- () 12. A journal entry is never made for a renewed note.
- () 13. The reserve for depreciation account represents an additional ast.
- () 14. Accrued expenses are liabilities.
- () 15. Repairs to Buildings is a liability account.

PART III

DIRECTIONS: In each blank space write the word or term which makes these statements complete and true in meaning.

1. If assets exceed liabilities, the difference is _____
2. In closing the ledger, the balance of the Merchandise Sales account is transferred to the _____
3. Values received are _____ to the appropriate accounts.
4. The net worth of a business at a given time is _____
5. The journal which records only merchandise sales is called _____
6. Adjusting entries are recorded in the _____ journal.
7. The blank on which the details of a deposit are written is a _____
8. The _____ account is used to record on the seller's books the discount allowed customers.
9. The value of the merchandise on hand at the time the books are opened is debited to the _____ account.
10. To honor a sight draft means to _____ it.
11. Interest deducted by a bank at the time a loan is made is called _____ discount.
12. Sundry expenses which occur infrequently or are small in amount are debited to the _____ account.
13. All income and expense accounts are _____ accounts.
14. The accrued property taxes for a period are _____ to the Accrued Property Taxes Account.
15. When proving cash, use only the _____ column on either side of the cash journal.

PART IV

DIRECTIONS: The following items refer to trial balance after the adjusting entries have been posted. Indicate in parenthesis for each account whether the balance is debit (D), or credit (C).

- | | |
|--|---|
| <ol style="list-style-type: none"> () 1. Land. () 2. Prepaid insurance () 3. Accrued taxes. () 4. Patents. () 5. Advertising expense. () 6. Sales returns. () 7. Accrued advertising expense () 8. Depreciation on building. | <ol style="list-style-type: none"> () 11. Notes payable. () 12. Sales. () 13. Sales discount. () 14. Selling expense. () 15. Reserve for building deprec. () 16. Accrued interest earned. () 17. Accrued salaries. () 18. A. B. Jones, capital. () 19. Office supplies on hand. |
|--|---|

TYPING TEST

PART I Name

DIRECTIONS: You will be allowed two attempts in writing the following. You will be timed for ten (10) minutes for each attempt. Complete both copies. Double-space and set margins at 10 and 75.

Check on duties performed by all classes of secretaries was de-
 ed--those who had had only eighth grade and business school train-
 as well as those who had finished in a college secretarial course.
 the same time, it was highly desirable to prepare the list in such
 ay that there would not be too heavy a weighting upon the lower
 ss positions, which would presumably be held by the secretaries
 h the least training. The sources from which mailing lists were
 ained are as follows:

| | |
|--|-----|
| Margaret Morrison Carnegie College | 150 |
| Drexel Institute | 182 |
| Simmons College | 373 |
| Duff's Business College (Pittsburgh) | 179 |
| Miss Conley's Business School (Pittsburgh) | 50 |
| Katherine Gibbs' School (Boston) | 94 |
| Katherine Gibbs' School (New York) | 107 |
| Katherine Gibbs' School (Providence) | 118 |
| The Moser Shorthand College (Chicago) | 100 |

The percentage of returns on this questionnaire was unusually
 h. Over 42 per cent of the secretaries to whom the list was sent
 sponded.

PART II

DIRECTIONS: Center the following on a page:

- (1) TYPIST.
- (2) MIND WILL, EVENTUALLY, TRIUMPH OVER MERE MATTER

PART III

DIRECTIONS: Indicate by word or phrase the position or function of the following parts of the machine.

- | | |
|-------------------------------|----------------------------------|
| (1) Cylinder. | (16) Shift keys. |
| (2) Cylinder knobs. | (17) Shift lock. |
| (3) Paper-edge guide. | (18) Back-space key. |
| (4) Paper release. | (19) Ribbon spools. |
| (5) Paper clamps. | (20) Ribbon reverse. |
| (6) Line-space gauge. | (21) Drum winder. |
| (7) Line-space lever. | (22) Line scales. |
| (8) Front scale. | (23) Variable line space device. |
| (9) Margin stops and rack. | (24) Paper rest. |
| (10) Margin stop release. | (25) Ribbon-position device. |
| (11) Type-bar guide. | (26) Ribbon cut out. |
| (12) Ribbon guide. | (27) Tabulator rack and scale. |
| (13) Printing-point indicator | (28) Tabulator stops. |
| | (29) Tabulator key. |

TYPING SCORES FOR GROUP I

| No. | A | B | C | D | E |
|-----|----|----|----|----|----|
| 11 | 98 | 91 | 93 | 97 | 97 |
| 2 | 89 | 87 | 93 | 94 | 92 |
| 3 | 84 | 86 | 90 | 93 | 88 |
| 4 | 81 | 84 | 89 | 90 | 86 |
| 5 | 78 | 84 | 88 | 90 | 82 |
| 6 | 78 | 84 | 88 | 86 | 77 |
| 7 | 78 | 82 | 87 | 85 | 77 |
| 8 | 76 | 80 | 81 | 83 | 75 |
| 9 | 76 | 79 | 78 | 80 | 72 |
| 10 | 73 | 76 | 77 | 75 | 72 |
| 11 | 72 | 73 | 76 | 74 | 69 |
| 12 | 72 | 73 | 73 | 69 | 65 |
| 13 | 72 | 73 | 72 | 62 | 63 |
| 14 | 68 | 71 | 72 | 61 | 63 |
| 15 | 65 | 66 | 71 | | 63 |
| 16 | 63 | 64 | 70 | | 61 |
| 17 | 63 | 62 | 69 | | 60 |
| 18 | 62 | 61 | 66 | | 59 |
| 19 | 61 | 60 | 63 | | 58 |
| 20 | 61 | 59 | 58 | | 55 |
| 21 | 60 | 55 | 56 | | 53 |
| 22 | 60 | 53 | 51 | | 51 |
| 23 | 59 | 50 | 51 | | 51 |
| 24 | 56 | 50 | 48 | | 47 |
| 25 | 55 | | 47 | | 45 |
| 26 | 53 | | 46 | | |
| 27 | 51 | | 46 | | |
| 28 | 51 | | | | |
| 29 | 47 | | | | |
| 30 | 45 | | | | |
| 31 | 44 | | | | |
| 32 | 42 | | | | |
| 33 | 42 | | | | |
| 34 | 40 | | | | |
| 35 | 39 | | | | |
| 36 | 34 | | | | |
| 37 | 31 | | | | |
| 38 | 30 | | | | |
| 39 | 25 | | | | |

BOOKKEEPING SCORES FOR GROUP I

| No | A | B | C | D | E | F |
|----|----|----|----|----|----|----|
| 1 | 79 | 87 | 78 | 84 | 82 | 87 |
| 2 | 74 | 80 | 76 | 80 | 79 | 85 |
| 3 | 73 | 78 | 76 | 76 | 78 | 85 |
| 4 | 70 | 74 | 71 | 75 | 76 | 84 |
| 5 | 70 | 73 | 64 | 72 | 74 | 80 |
| 6 | 69 | 70 | 54 | 63 | 71 | 77 |
| 7 | 67 | 69 | 54 | 62 | 69 | 77 |
| 8 | 65 | 68 | 50 | 60 | 65 | 75 |
| 9 | 64 | 60 | 42 | 56 | 59 | 74 |
| 10 | 59 | 59 | 40 | 56 | 54 | 70 |
| 11 | 59 | 56 | 35 | 53 | 53 | 70 |
| 12 | 37 | 55 | | 49 | 47 | 70 |
| 13 | | | | | 42 | 68 |
| 14 | | | | | 40 | 65 |
| 15 | | | | | 39 | 69 |
| 16 | | | | | 38 | 59 |
| 17 | | | | | | 55 |
| 18 | | | | | | 51 |
| 19 | | | | | | 48 |
| 20 | | | | | | 47 |
| 21 | | | | | | 42 |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |

TYPING SCORES FOR GROUP II

| No. | A | B | C | D | E | F | G |
|-----|---|----|----|----|----|-----|----|
| 1 | | 86 | 96 | 93 | 93 | 100 | 90 |
| 2 | | 79 | 89 | 83 | 91 | 99 | 87 |
| 3 | | 68 | 89 | 91 | 79 | 98 | 81 |
| 4 | | 62 | 85 | 91 | 72 | 97 | 80 |
| 5 | | 51 | 83 | 90 | 71 | 94 | 79 |
| 6 | | 51 | 82 | 88 | 70 | 89 | 77 |
| 7 | | 40 | 79 | 85 | 70 | 86 | 74 |
| 8 | | 39 | 79 | 85 | 69 | 79 | 74 |
| 9 | | 19 | 78 | 82 | 69 | 76 | 71 |
| 10 | | | 77 | 82 | 68 | 75 | 67 |
| 11 | | | 77 | 81 | 68 | | 66 |
| 12 | | | 75 | 80 | 66 | | 62 |
| 13 | | | 72 | 80 | 65 | | 51 |
| 14 | | | 69 | 77 | 63 | | 47 |
| 15 | | | 68 | 73 | 63 | | |
| 16 | | | 62 | 70 | 54 | | |
| 17 | | | 62 | 67 | 53 | | |
| 18 | | | 59 | 66 | 52 | | |
| 19 | | | 56 | 66 | 52 | | |
| 20 | | | 49 | 63 | 51 | | |
| 21 | | | 43 | 61 | 50 | | |
| 22 | | | 37 | 59 | 44 | | |
| 23 | | | | 58 | 35 | | |
| 24 | | | | 54 | 27 | | |
| 25 | | | | 54 | | | |
| 26 | | | | 49 | | | |

BOOKKEEPING SCORES FOR GROUP II

| No. | A | B | C | D | E | F | G |
|-----|----|----|-----|----|----|----|----|
| 1 | 88 | 85 | 118 | 95 | 80 | 77 | 79 |
| 2 | 55 | 74 | 94 | 93 | 74 | 78 | 73 |
| 3 | 52 | 72 | 72 | 92 | 73 | 75 | 70 |
| 4 | 51 | 71 | 72 | 89 | 70 | 74 | 68 |
| 5 | 46 | 67 | 72 | 85 | 70 | 68 | 65 |
| 6 | 42 | 66 | 69 | 79 | 69 | 68 | 61 |
| 7 | 42 | 64 | 68 | 75 | 66 | 67 | 60 |
| 8 | 38 | 64 | 67 | 74 | 66 | 54 | 59 |
| 9 | | 63 | 67 | 74 | 64 | 46 | 58 |
| 10 | | 62 | 62 | 72 | 64 | 40 | 53 |
| 11 | | 62 | 62 | 72 | 62 | | 52 |
| 12 | | 61 | 62 | 66 | 61 | | 50 |
| 13 | | 60 | 59 | 62 | 60 | | 46 |
| 14 | | 60 | 54 | 57 | 60 | | 34 |
| 15 | | 60 | 54 | 57 | 59 | | 30 |
| 16 | | 60 | 50 | 55 | 52 | | |
| 17 | | 60 | 44 | 55 | 58 | | |
| 18 | | 58 | | 55 | 57 | | |
| 19 | | 58 | | 54 | 57 | | |
| 20 | | 58 | | 41 | 57 | | |
| 21 | | 54 | | 48 | 53 | | |
| 22 | | 52 | | 44 | 55 | | |
| 23 | | 52 | | 39 | 54 | | |
| 24 | | 50 | | 32 | 53 | | |
| 25 | | 50 | | | 50 | | |
| 26 | | 49 | | | 49 | | |
| 27 | | 47 | | | 47 | | |
| 28 | | 46 | | | 47 | | |
| 29 | | 44 | | | 44 | | |
| 30 | | 43 | | | 38 | | |
| 31 | | | | | 37 | | |
| 32 | | | | | 37 | | |

TYPING SCORES FOR GROUP III

| No. | A | B | C | D | E | F |
|-----|----|----|----|---|----|----|
| 1 | 86 | 85 | 75 | | 82 | 79 |
| 2 | 85 | 81 | 75 | | 79 | 76 |
| 3 | 85 | 78 | 74 | | 74 | 75 |
| 4 | 82 | 72 | 72 | | 72 | 74 |
| 5 | 79 | 72 | 70 | | 71 | 72 |
| 6 | 77 | 71 | 70 | | 66 | 72 |
| 7 | 76 | 68 | 70 | | 66 | 71 |
| 8 | 73 | 65 | 67 | | 63 | 68 |
| 9 | 72 | 64 | 65 | | 62 | 64 |
| 10 | 71 | 47 | 62 | | 54 | 64 |
| 11 | 66 | 43 | 62 | | 51 | 63 |
| 12 | 61 | | 62 | | 47 | 61 |
| 13 | 59 | | 62 | | 46 | 60 |
| 14 | 58 | | 62 | | 42 | 55 |
| 15 | 58 | | 57 | | 40 | 55 |
| 16 | 55 | | 53 | | | 49 |
| 17 | 50 | | 50 | | | 46 |
| 18 | 49 | | 50 | | | 45 |
| 19 | 45 | | 49 | | | 42 |
| 20 | 39 | | 46 | | | 40 |
| 21 | 37 | | 45 | | | |
| 22 | | | 45 | | | |
| 23 | | | 44 | | | |
| 24 | | | 44 | | | |
| 25 | | | 44 | | | |
| 26 | | | 40 | | | |
| 27 | | | 37 | | | |
| 28 | | | 32 | | | |
| 29 | | | 31 | | | |
| 30 | | | 28 | | | |
| 31 | | | 26 | | | |
| 32 | | | 25 | | | |
| 33 | | | 22 | | | |
| 34 | | | 20 | | | |
| 35 | | | 19 | | | |

BOOKKEEPING SCORES FOR GROUP III

| No. | A | B | C | D | E | F |
|-----|----|---|---|----|----|----|
| 1 | 61 | | | 65 | 68 | 68 |
| 2 | 61 | | | 62 | 54 | 65 |
| 3 | 58 | | | 62 | 53 | 62 |
| 4 | 54 | | | 57 | 50 | 61 |
| 5 | 53 | | | 55 | 50 | 58 |
| 6 | 53 | | | 55 | 46 | 54 |
| 7 | 50 | | | 55 | 45 | 54 |
| 8 | 47 | | | 53 | 44 | 53 |
| 9 | 47 | | | 50 | 40 | 49 |
| 10 | 44 | | | 49 | 38 | 48 |
| 11 | 43 | | | 38 | 35 | 46 |
| 12 | 41 | | | 34 | 34 | 46 |
| 13 | 40 | | | 31 | | 43 |
| 14 | 31 | | | 28 | | 41 |
| 15 | | | | | | 40 |
| 16 | | | | | | 38 |
| 17 | | | | | | |
| 18 | | | | | | |

TYPING SCORES FOR GROUP IV

| No. | A | B | C | D | E | F |
|-----|----|----|----|----|----|----|
| 1 | 85 | 73 | 78 | 94 | 86 | 88 |
| 2 | 84 | 72 | 66 | 93 | 84 | 87 |
| 3 | 81 | 72 | 59 | 91 | 82 | 84 |
| 4 | 81 | 71 | 55 | 87 | 80 | 79 |
| 5 | 79 | 67 | 49 | 87 | 78 | 79 |
| 6 | 77 | 67 | 41 | 86 | 78 | 76 |
| 7 | 75 | 63 | 28 | 82 | 75 | 72 |
| 8 | 75 | 65 | 27 | 82 | 72 | 70 |
| 9 | 72 | 65 | 22 | 82 | 72 | 69 |
| 10 | 70 | 63 | 20 | 78 | 70 | 69 |
| 11 | 70 | 61 | 16 | 75 | 66 | 65 |
| 12 | 70 | 55 | | 74 | 63 | 63 |
| 13 | 68 | 47 | | 71 | 58 | 50 |
| 14 | 63 | 47 | | 71 | 57 | 49 |
| 15 | 61 | 46 | | 67 | 50 | 42 |
| 16 | 58 | 43 | | 65 | 48 | |
| 17 | 57 | 40 | | 64 | | |
| 18 | 47 | 30 | | 62 | | |
| 19 | 46 | | | 60 | | |
| 20 | 42 | | | 58 | | |
| 21 | 30 | | | 53 | | |
| 22 | 30 | | | | | |

BOOKKEEPING SCORES FOR GROUP IV

| No. | A | B | C | D | E | F |
|-----|----|----|----|----|----|---|
| 1 | 72 | 72 | 71 | 70 | 69 | |
| 2 | 71 | 67 | 68 | 68 | 65 | |
| 3 | 67 | 56 | 59 | 64 | 64 | |
| 4 | 59 | 46 | 59 | 59 | 64 | |
| 5 | 57 | 45 | 57 | 57 | 62 | |
| 6 | 55 | 42 | 53 | 52 | 60 | |
| 7 | 54 | 42 | 53 | 50 | 58 | |
| 8 | 53 | 41 | 52 | 46 | 56 | |
| 9 | 51 | 40 | 51 | 42 | 55 | |
| 10 | 50 | 39 | 45 | 39 | 55 | |
| 11 | 50 | 39 | 44 | 38 | | |
| 12 | 47 | 34 | 41 | 32 | | |
| 13 | 44 | 34 | 35 | | | |
| 14 | 43 | 33 | 33 | | | |
| 15 | 39 | 33 | 27 | | | |
| 16 | 38 | 32 | | | | |
| 17 | 35 | 31 | | | | |
| 18 | | 29 | | | | |

TYPING SCORES FOR GROUP V

| No. | A | B | C | D | E |
|-----|----|----|---|---|----|
| 1 | 97 | 98 | | | 98 |
| 2 | 96 | 97 | | | 84 |
| 3 | 96 | 92 | | | 93 |
| 4 | 95 | 91 | | | 90 |
| 5 | 94 | 86 | | | 88 |
| 6 | 91 | 84 | | | 88 |
| 7 | 91 | 83 | | | 84 |
| 8 | 90 | 83 | | | 82 |
| 9 | 90 | 82 | | | 82 |
| 10 | 87 | 81 | | | 82 |
| 11 | 84 | 79 | | | 80 |
| 12 | 83 | 79 | | | 79 |
| 13 | 83 | 77 | | | 77 |
| 14 | 82 | 77 | | | 76 |
| 15 | 81 | 75 | | | 73 |
| 16 | 79 | 69 | | | 71 |
| 17 | 77 | 68 | | | 69 |
| 18 | 78 | 66 | | | 65 |
| 19 | 76 | 57 | | | 65 |
| 20 | 76 | | | | 64 |
| 21 | 75 | | | | 62 |
| 22 | 72 | | | | |
| 23 | 67 | | | | |
| 24 | 67 | | | | |
| 25 | 66 | | | | |
| 26 | 65 | | | | |
| 27 | 64 | | | | |
| 28 | 61 | | | | |
| 29 | 61 | | | | |
| 30 | 56 | | | | |
| 31 | 56 | | | | |
| 32 | 51 | | | | |
| 33 | 49 | | | | |
| 34 | 43 | | | | |
| 35 | 34 | | | | |
| 36 | | | | | |